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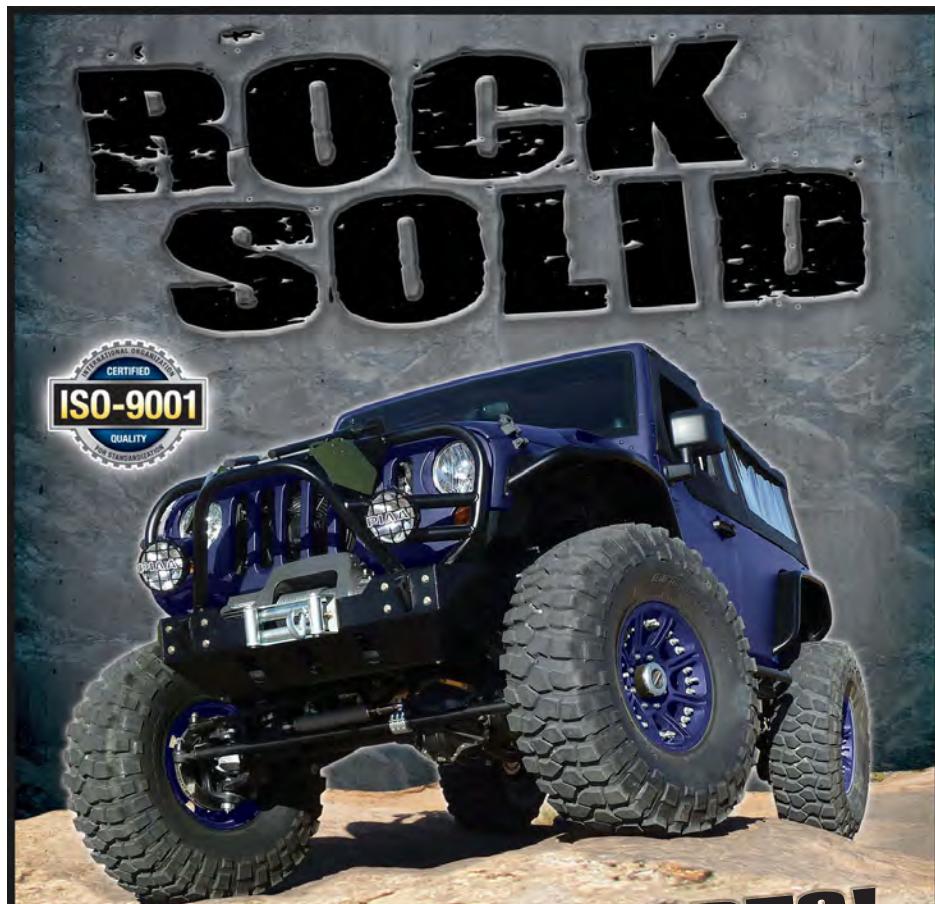
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# APPROACH ANGLE

STORY & PHOTOS  
BY BUDD STANLEY



The 2017 Raptor was a welcome surprise at the NAIAS

## I know when you read this, the

“new car smell” of a new year will already be wearing off, but as I am writing this in early January, it seems wrong not to feel excited about the start of a fresh calendar. And so I should, as 2015 is looking like it will be a great year for the 4WD community.

For one, there is a lot to look forward to in the new car world. I can’t remember a year when there were so many all-new 4WD’s tumbling onto the scene all at once. I just happen to be writing this editorial in the Detroit International Airport, still exhausted and 4WD-drunk from the massive quantity of trucks that were tossed in front of my face (and camera) over a two day binge of flash, pomp, circumstance, shiny metal and scantily clad models.

I can feel the manufacturers PR people loading up new product launches like a firing squad with a machine gun, ready to strafe the press corps with a constant barrage of fresh new 4WD metal. Nissan’s new Cummins powered Titan will be one of the first and perhaps most interesting

launches, and we can’t wait to see what this Japanese-American partnership will yield. Likewise, one of our favourites, the Tacoma is getting a long deserved refresh and Ram is going Raptor fighting with a new 1500. Not to mention, Ford let us in on what the next generation Raptor will look like. As such, this issue is pretty new vehicle heavy as NAIAS hit us with a sneak peak of the whole year to come, but if it’s the trail reports and older 4WD’s you’re savouring, not to worry.

Future issues in 2015 will have us revisiting some projects we started in 2014 and start a couple new ones at the same time. Stinky Jeep is getting a heart transplant, while my Samurai will also finally move under its own power. Fresh builds being teed up include a working mans F-350, a Tacoma trail rig, a couple of Jeeps and we finally dive into Project Canyoneo. You’ll want to stay tuned for that.

We are not just testing new trucks and building up old ones, we’re going to be out on the trails and planning some new chal-



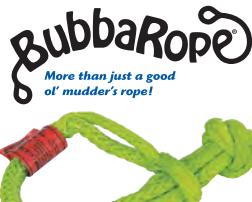
lenges for 2015. We have some epic long distance expeditions planned later this year and one we’ve already completed... err... attempted, you know how it goes.

2015 promises to be an exciting year and we can’t wait to bring you all along for the ride. We will do our best to cover as much Canadiana as we can in these pages. And for those who want to keep up to date online, check out our Facebook page at [www.facebook.com/4WDrive](http://www.facebook.com/4WDrive), and Editor-in-Chief Mack has informed me that we are also now on “the Twitter...” (@4WDriveCanada). I guess I’ll have to come kicking and screaming into the 21st century now.

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# CRAWLIN' COLUMN #26

By Rich Walker, Photo by Kelly Walker



## Happy New Year everyone! I

**hope your holidays** were plentiful, relaxing and filled with lots of quality family time. I know mine were. Here's to wishing you all a very prosperous and wheelin' filled 2015.

By the time you read this, most likely The 2015 King Of The Hammers will be a thing of the past, but for me right now, that is all that's on my mind. As I write this, I have a stack of paper on my desk with flight itineraries, rental car agreements, pit maps, and check lists all for KOH '15. In just under a month I hop on a plane destined for Palm Springs where I will pick up my rental car (or Pre-Runner as I call it) and head out to the lakebed for eight days of playing in the dirt with my friends.

I know I've said it before, but yet again, this year will be bigger and better than year's past. For the second year in

a row, there will be a "Shootout" on the famous BackDoor obstacle on Monday night. Again, it will be an Ultra4 vs. Rock Bouncer shootout with one winner from each coast. Plus, this year they have added a third payout for an independent driver. So if you are not a Ultra4 or Bouncer, but have a beat up old Sidekick, Toy pickup or weekend warrior buggy you can go play too. I remember last year an older four-door Sidekick that was all dented and beat to hell entered the challenge and laid a beat down on the obstacle and put down one of the fastest times.

The 2014 SCORE Baja 1000 took place over five days in November (11th-15th). The race saw over 230 teams leave the start line in Ensenada and try their machines against the 1,275 miles course to La Paz. Take a quick second and think about that. That's 1,275 miles over some of the roughest and deadliest terrain on

earth as fast as you can go.

Once again, the Trophy Truck class set the fastest time with a team of superstars tag-teaming the driving duties. Rob MacCachren, Andy McMillin and Jason Voss averaged 56.64 mph and finished the race in 22 hours and 31 minutes. That is impressive if you ask me. Especially considering that only 133 teams even crossed the finish line, some taking over 48-hours to complete the course. Could you imagine racing for 48 hours straight? That's Baja!

One last thing, if you are a true rock crawler at heart, like me, then check out Sand Hollow Flats in St. George, Utah. Similar to Moab style terrain, this area is being named "Rock Crawler's Heaven". It's an OHV area with named, rated and marked trails. Trails rate anything from a 1 all the way to above 10 (that's buggy only). With trail

names like The Maze, Nast Half, Chain Reaction, Fault Line and TNT, you can imagine what you could get yourself in to. Every year there is an event there called Winter On The Rocks and people with varying levels of rigs come from all over to attend. We are currently planning a trip there this year and I am super excited to find some new trails similar to the ones I have loved for years in Moab. So far, it is early in the planning stages, but we are determined to make our way down there before it gets too hot. I will be sure to keep you all posted and bring you some coverage when we're back.

Man, I just thought of something. It's only two weeks into 2015 and I already have three trips planned; KOH, Vegas for Monster Jam World Finals in March, and Sand Hollow. And here I was going to try and slow things down in 2015...

*Stay safe and see you on the trails (in Utah!)*



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**REVIEW**

# FROZEN RUSH, FROZEN KNACKERS

AND THE BFG KO2 AT SUNDAY RIVER RESORT

Story and photos  
by Perry Mack



Sunday River Ski Resort across  
the valley from the test trail.

*It's -21 C and with the wind-chill it feels like -32 C. My spit doesn't quite freeze before it hits the ground, but it's close. US Airways lost my luggage, including my hat, gloves, winter coat and boots. I've lost feeling in all my extremities wandering around in the dark looking for my room, so it's a good thing that I don't plan to have any more children.*

Conditions are pretty much perfect. Perfect for testing winter tires - not for having children.

When I last reviewed the new BFG KO2, I gave the tire high marks for having the snow rating but couldn't comment on snow performance with any confidence. Apparently the folks at BFG also read 4WDrive and they took my comments to heart.

So they flew me to Bethel, Maine to see some BFG tires race in Redbull's Frozen Rush at Sunday River Ski resort, and to crawl the snow covered forest service roads in Wrangler Rubicon's, and a Land Rover Defender, with the new KO2 tires. I had a chance to drive different sizes with the tires aired down to 16 psi. Aside from the frozen knackers, I was pretty happy with the situation.

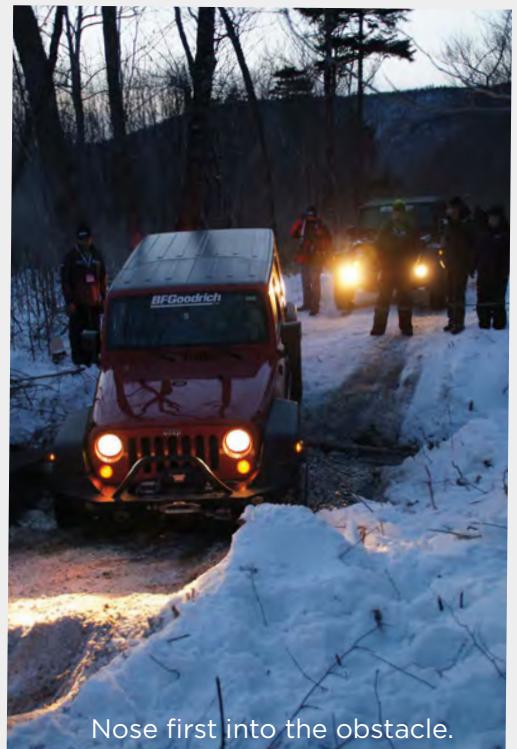
BFG hired a 4x4-training company to clear roads and build obstacles on private land for select Canadian media and

tire dealers to put the KO2 through its paces. The same company trains drivers to handle extreme off-road conditions, including training US soldiers to drive their Hummers.

After a cold day at Sunday River watching the Frozen Rush Qualifiers, our convoy of Jeeps and the Defender set out into the White Mountains of the Appalachians, just a short drive south of Quebec and west of New Brunswick.

The sun was already setting as we began our crawl though the forest. Yes, we were in 4WD with lockers and sway bars disconnected to cross the obstacles. No, they are not a miracle tire that will allow you to ford ice-covered streams, snowy rocks and icy logs in two wheel drive (we tried, ... they'll be able to fix that Wrangler). But they are a tire that provided inspiring traction over obstacles and on packed snow through ascents and descents.

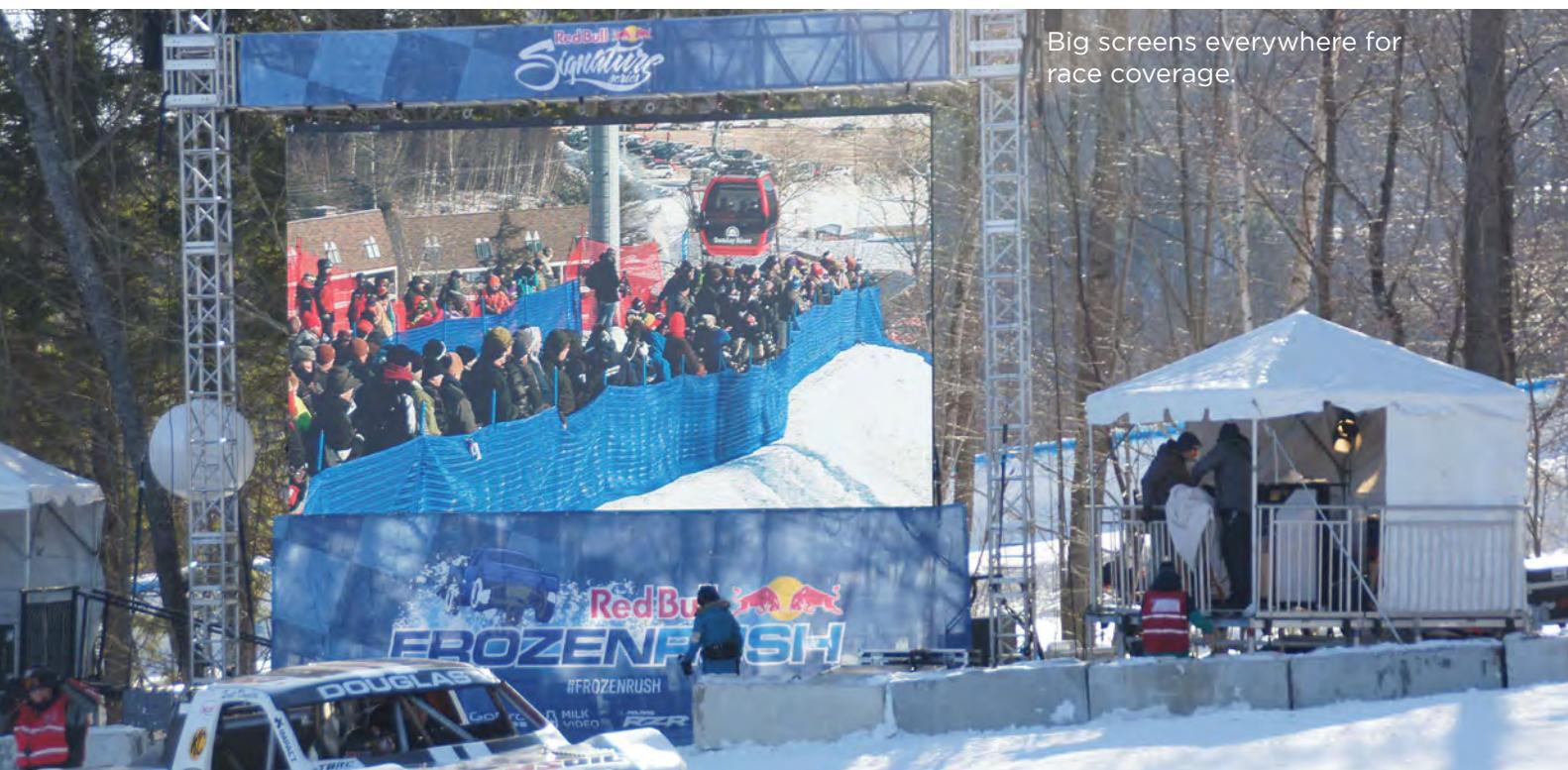
My co-drive Woody, from [www.ihatemud.com](http://www.ihatemud.com), has been driving a set of 315's



Nose first into the obstacle.

for a month. He doesn't like the sound of the tires. 'But they're relatively quiet' I said, thinking I misunderstood his Wisconsin accent. 'Which is why I hate them,' he replied. I'm hearing all sorts of new noises from my 80 series Toyota.'

BFG says the KO2 has 19% better snow traction than their beloved KO tire, originally designed 15 years ago. In case you're wondering how they determined



Big screens everywhere for race coverage.

The Redbull Frozen Rush is the only Pro 4 short course race on snow. 900 horsepower 4WD machines, essentially designed for desert racing, compete head-to-head on custom spiked 35" tires from the BFGoodrich Research and Development Team.

Bryce Menzies beat defending champion Ricky Johnson to take the 2015 title. Read and see more at [www.redbull.com](http://www.redbull.com).

this, it's called the ASTM F1805 test, which was conducted by a third party.

I spoke with Andrew Comrie-Picard (professional race car driver, stunt driver, automotive journalist and spokesperson for BFG) during the test drive and his comment with respect to traction was, 'What can't be measured is the consistency in the performance of the tire. You always know what it will do' he says. 'In off-road racing, it lets you push the vehicle to the limit, in everyday life it means you drive confidently knowing the traction will be there regardless of the conditions.'

The improved traction is a result of a combination of improved rubber compounds, the dog bone and C shaped lugs

- at varying angles that grip and shed snow throughout the turn - and improved siping to disperse water. A Canadian winter day can start with frozen morning ice, which then becomes covered in snow, which turns to slush as the day warms, and then icy cold water as the sun continues to shine - or rain begins (and repeat).

If you're looking for one tire on your 4x4 light truck to work well off-road, in mud, on dry, snow and wet pavement, this is your tire. The \$200 you save on a cheaper tire isn't worth the aggravation in early wear, less traction and the stress that results from inconsistent performance.

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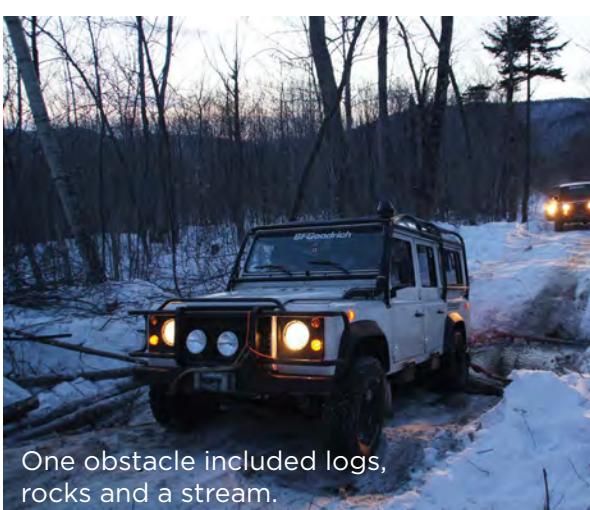
**Red Bull**



Wrangler Unlimited Rubicons to test the BFG K02.

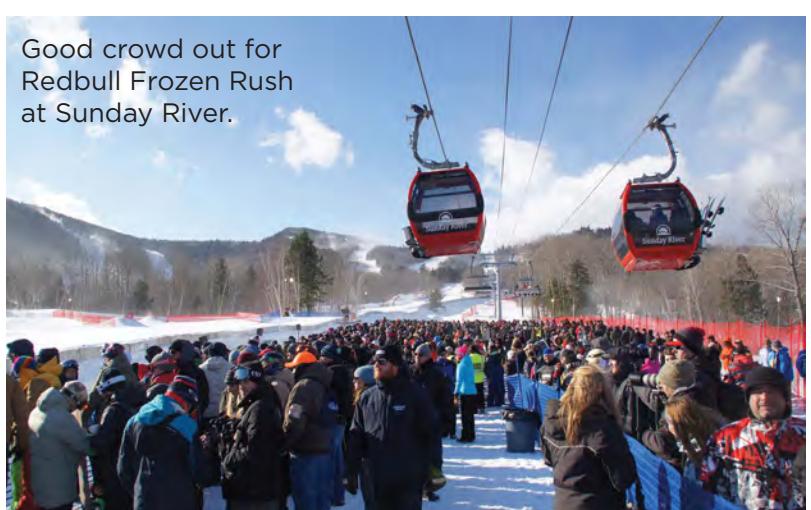


Start Line for Frozen Rush.



One obstacle included logs, rocks and a stream.

Good crowd out for Redbull Frozen Rush at Sunday River.



# Tom Wood's

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**STEP #1** Type of drive shaft needed?\*

\*Note: Modified vehicles may require a type that is different from the original.

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Conventional - 2 Joint



May have flange at either end.

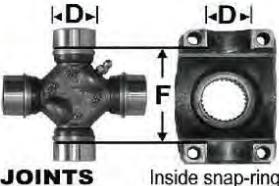
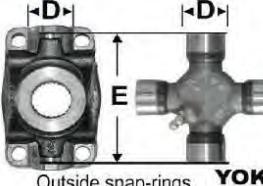
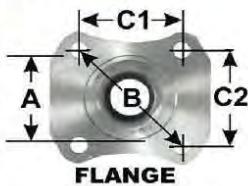
Reverse Slip



May have flange at differential end.

**STEP #2** Attachment at each end?\*

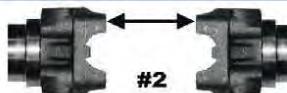
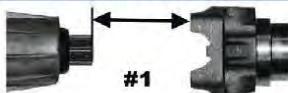
\*Note: May not be required on many applications.



A= Pilot diameter. B= Bolt circle diameter. C1 & C2 = Chord length D= Bearing cap diameter or diameter of half-round cutout in yoke. E= Width of universal joint or span between centering lugs. F= Outside edge of universal joint snap-ring grooves or inside span of broached surfaces on yoke. G= Tooth count of splines. H= Major diameter of splines.

**STEP #3** Measure for length\*

\*Note: Some applications may require measuring through the range of suspension travel.



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**FEATURE**

STORY BY BUDD STANLEY AND JON-BALDUR THORBJÖRNSSON  
PHOTOS COURTESY OF ISAK

# TURN YOUR 4WD INTO



## a Winter Wheeler

BASICS TO MAKE YOUR 4WD SNOW WHEELER THE ICELANDIC WAY



*We are starting a new series here at 4WDrive Magazine entitled "Turn your 4WD Into..." For the vast majority of us, we start out this lifestyle with a basic run of the mill stock 4WD. From there we figure out what genre of the off-roading game attracts us most and we slowly tailor our machine into an off-road specialist. However, with so many different ways to wheel, there is a great many ways to specialize your vehicle.*

**T**hat is why we are going to be talking to the experts. As we are in the dead of winter at the time of writing, and Canada has seen a particularly healthy helping of snow this year, lets start out with the basics one would need to turn their 4WD into a snow wheeler.

Throughout the country, there are entire clubs dedicated to just this one genre of off-road driving. Many snow rigs are built solely for the snow and are often put into hibernation over the warmer months, much the opposite of most 4WDs.

So, what do you need to know to get started? A couple issues back we talked with Jón Baldur Þorbjörnsson, the owner of ISAK (an Icelandic Super Jeep rental and touring company – [www.isak.is](http://www.isak.is)), about the basics of driving in the snow. Inevitably, our conversation switched from driving to the machines that get Jon and his tour groups through some of Iceland's most inhospitable environments.

The ISAK rental vehicle fleet is not your usual car hires. These vehicles are suitably rugged to take you up into the farthest reaches of Iceland no mater how bad the weather. There are unmodified Land Rover Defender 110's, Jeep Wrangler Rubicon's and just recently, some new Toyota Land Cruiser 76's for backcountry roads and trails. However, for full winter expeditions, ISAK employ 16 Land Rover Defender 110 "Super Jeeps" that are ideally outfitted to take tours cross-country in deep snow, across glaciers and just about anywhere one might want to go in the dead of winter, no mater how much snow has fallen.

These Super Jeeps are exactly what we wanted to talk to Jon about, as they represent what makes a good starting point when building a winter wheeler. As Jon explains, it comes down to three main areas of focus, which we will now detail:

## **Tires**

If there is one thing that sets a winter wheeler apart from all other 4WD's, it is tires. Winter wheelers don't just have large tires to increase the clearance between the ground and the axle, but almost as important is the tires width as well. When it comes to deep snow, high flotation and aggressive tread pattern is key. When you need to float on top of the snow, the bigger the contact patch, the better.

As such, tires that have a strong internal carcass to handle very low inflation are ideal, as are rubber compounds that will not warm up. Low tire pressures increase the tires temperature, thus running the risk of icing or polishing the surface underneath.

Choosing the right tire depends on the weight of the vehicle, however a common starting point for a mid-sized truck or SUV is a 38x14 tire. A common example found on many Icelandic winter wheelers (and Canadian) is the Dick Cepek Fun Country. Always take into account the dimensions of your vehicle and match the proper size and offset wheel for correct placement.

## **Suspension**

A common trend in Iceland is not to lift a 4WD too high. The first reaction many will have to mounting large tires is that the vehicle will need to be lifted to clear these tires. The problem is that the higher you lift a vehicle, not only do you start to destroy its ride and handling, but also its balance. This hinders its performance and stability in the snow as well.

The nice thing about snow is once everything is covered, previously undulating terrain is flattened out. So, the ISAK Defenders are kept as low as possible with about a 10 cm lift, while also having longer travel. When there are tire clearance issues, the fenders are cut to accommo-



High floatation tires are key when wheeling in the snow. The bigger contact patch the better.



Choosing the right amount of lift to stay on top of the snow, but not sacrifice stability is key.

date the larger tires and fender flares are placed overtop to comply with Icelandic traffic laws, which happen to be similar to our own.

### Drivetrain

For the most part, the biggest issue with the drivetrain is to suitably reinforce it to handle the larger tires. In the ISAK's case, this means a slight reduction in final drive ratio's to make it easier to get those big tires moving. If you need to break into the axles, sourcing out a good quality locker for both the front and rear is always a good investment when you might find yourself windshield deep in the white stuff.

### Added Equipment

Wheeling in the winter comes with its own set of difficulties and issues when something goes wrong. As such, there are a couple winter-focused pieces of equipment that should always be carried onboard a winter wheeler. In the case of the ISAK's, Jon ensures they are always equipped with a shovel and a rope, which are the most essential. Also packed inside is a basic toolkit for small repairs, a tire repair kit, first aid kit, an air hose and pressure gauge and a good window scraper.

ISAK Defenders make use of a portable tow hook for the rear or the front bumper, an engine driven air compressor to inflate the tires, a Hi Lift jack and

base plate, GPS and a VHF radio. It goes without mentioning that suitable personal survival supplies should also be carried depending on the conditions you might find in the wilderness.

Just remember that this is just a recommended starting point. Once you outfit your 4WD for the snow, experience and lessons learned on the trail will then guide you to further fine tune and specialize your 4WD to your needs. We can give you the starting point, but only you know what you really want, once you start to get to know your vehicle and the conditions you most commonly find yourself in. So get out and enjoy Canada's winter.



Having a shovel and tow rope on board is a must have.

A compressor also helps to re-inflate tires.





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**REVIEW**

*Story and photos  
by Budd Stanley*

# Return of the **RENEGADE**

WILL THE 2015 JEEP RENEGADE BE THE SUZUKI SAMURAI OF THE 21ST CENTURY, OR JUST ANOTHER CUTE BRICK IN THE CUV WALL?



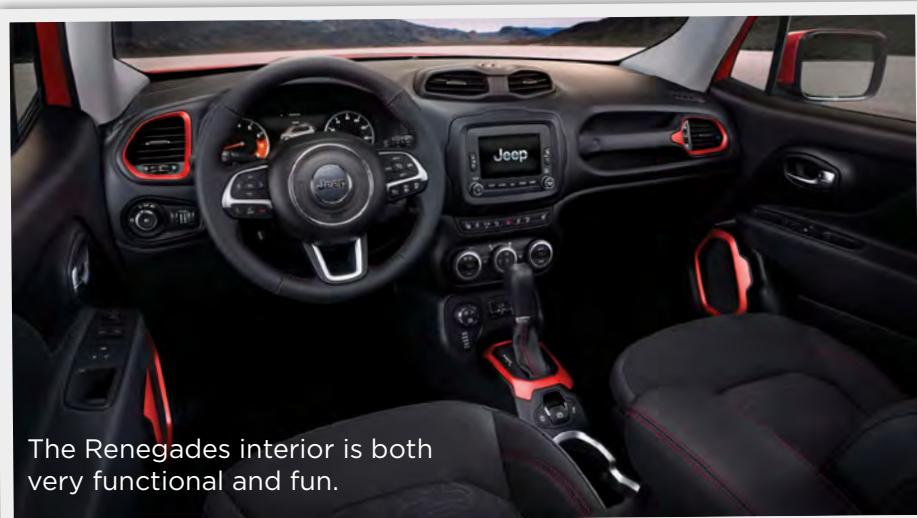
I'll be honest, when I heard that Jeep was going to build a new subcompact 4WD that would be built off a Fiat platform in Italy, I wasn't exactly getting excited. When Jeep promised me that it would be a proper 4WD, I started to think a little more about the concept. A proper mini 4WD... could Canada finally see a replacement for the Suzuki Samurai and Sidekick? Now I was eager to see what this Renegade might be all about.

If there is one thing we don't cover in this publication, it's the ever growing, painfully annoying popularity of the Crossover Utility Vehicle. If anything, we are the anti-CUV automotive publication; hey, it's in our name. But when Jeep came calling about the new release of their smallest vehicle yet, my curiosity got the better of me. They are Jeep after all, they take this off-road thing rather seriously and I was promised that the new Renegade is not an AWD, but an honest to goodness 4WD...ish vehicle and that its off-road credentials would not disappoint.

The Renegade looks like a proper little 4WD, quite boxy and sporting all the Jeep specific trademarks that make its older brothers stand apart. Large headlights, large grille and large fender flares on such a small vehicle really does give it a lot of character. You can almost hear it saying, "I'm going to be a Wrangler one day, just you wait and see."

Adding to the fun, Jeep has once again placed little Easter eggs all over the Renegade, with little Willy's flat fenders in the windshield, 7-post grille and headlight logos plastered anywhere the designers could hide them, there's probably a couple underneath on the skid plates if I looked. Another design feature is the embossed "X" that is found just about everywhere else. This is lifted from the reinforcement you would find on a Jerry Can, to help give the little Renegade a more utilitarian look.

However, utilitarian the Renegade is not. The interior looks absolutely brilliant, the materials are both high quality and soft to the touch. This has to be one of the best interiors in terms of build quality I've experienced in a Jeep, and one of the most fun and attractive I've ever seen in a mass produced vehicle. However, some of the trim



The Renegades interior is both very functional and fun.



around the rear doors could be mounted a little firmer. Very cool colour combinations are used, HVAC vents rise out of the dash and there is even a proper "Oh Sh!t" handle built into the dash. The Trailhawk has topographical maps of Moab inlaid into the seats and cubby pockets and there is a respectable amount of storage with a 524L cargo area. But more than anything, it's just a fun place to be.

Then there is the My Sky power retractable and removable sunroof. This is a stroke of genius, making use of two lightweight panels that can either be electrically retracted back like a regular sun roof or be taken straight out and stored under the rear cargo tray. The operation of taking them out is simple and both panels weight less than 5 kg (10 lb), probably one of my favourite features.

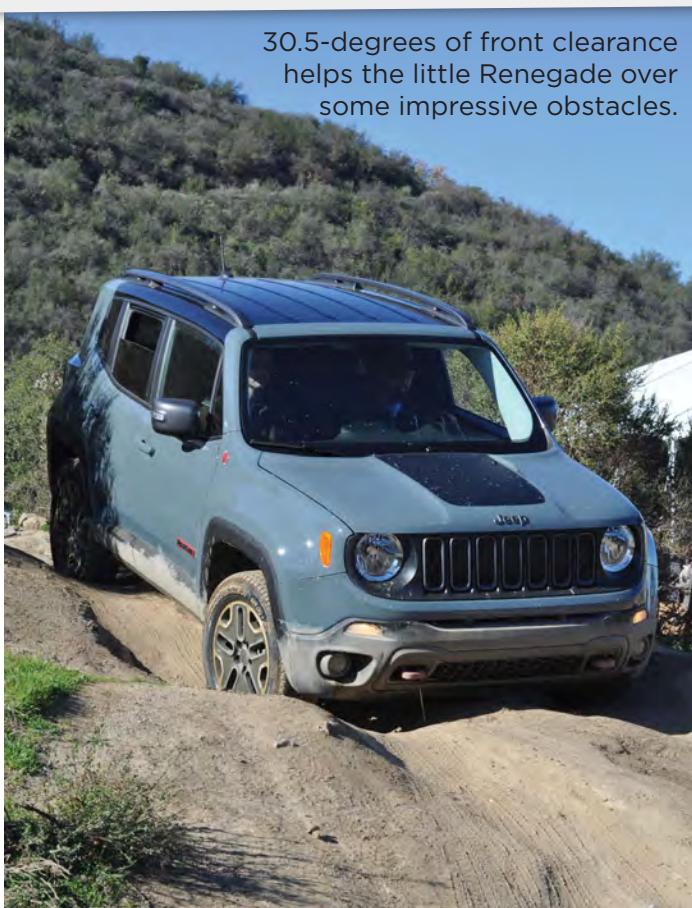
There will be two power options for the Renegade. The 2.4L Tigershark feels right at home in such a small vehicle.

Matched with the 9-speed transmission, this is all the engine you will ever need. The power and the acceleration left more than a couple V-6's standing at the stop light. However, what really surprised me was the 1.4L Turbo. Mated to the 6-speed manual gearbox this engine does not feel like you are in a lower equipped vehicle torque. With the turbo spooled up, the little 1.4L is a cheeky little bugger that only gives up 20 hp to the Tigershark and actually pumps out 9 lb-ft more torque.

Now I know, I'm really giving the Renegade the full thumbs up here, but there are a couple of things that scare me. The steering, while nicely weighted and sporting a quick ratio, does have a bit of a mind of its own. Like the Cherokee, it always seems to want to be in control more than the driver. Jeep also decided to use an electric E-brake rather than a hand brake. Yes, it makes more room for cup holders but I hate these things, and if you're going



The Trailhawk comes equipped with proper skidplating, tow hooks and a matte black hood decal to soak up the suns reflection.



30.5-degrees of front clearance helps the little Renegade over some impressive obstacles.

to use this vehicle in the wilds, the added control of a manual handbrake is something I find essential. Finally, the Renegade makes use of the same 9-speed transmission that you will find in the Cherokee. Lets just say that there have been a lot of teething issues with this transmission. Whether these issues will equate to the lighter Renegade will yet to be seen but at least there is a 6-speed manual option for the 1.4L. Unfortunately, the Trailhawk only comes equipped with the 9-speed auto.

Ripping through California's lovely twisting mountain roads, the Renegade handled itself admirably considering it is a 4WD. It is one of a fledgling number of fun to drive new vehicles and through the tight and twisties it was a blast. The ride soaked up imperfections beautifully and was surprisingly smooth on the highway with a frequency selective damping (FSD) front and rear strut system designed by Koni. However, you don't want to hear about that, you want to hear about the Trailhawk and how it tackles the trail.

Most of you are going to look at this little Jeep and scoff at what its abilities may be. But let me stop you there and proclaim this little trail terrorist to be punching well above its weight class. Yes, there is a Fiat 500X somewhere under that skin, but the Renegade was designed and engineered by Jeep in Michigan, and for the package they are working with, I think they have done a magnificent job.

The Trailhawk is the model you want, even if it is only \$4,225

away from a proper Wrangler Rubicon, which is pretty much the best out of the box 4WD sold in Canada. It's nearly the most expensive of the Renegade clan at \$31,145 (\$19,995 for Sport, \$25,995 for North Edition and \$31,995 for the Limited) but this is the one that will get you where you need to go. The Trailhawk comes equipped with a slight lift (.8-in), full-length skid plating, 215/65R17 Goodyear SR2 all-terrain tires, a full size spare (very nice), forged steel tow hooks ready to handle twice the Renegade's GVW and trim specific bumpers that increase clearances to 30.5-degrees front and 34.3-degrees rear angle. Inside you will also get a trim specific interior, the aforementioned Moab topo map theme and of course Jeeps Active Drive Low 4WD system and Selec-Terrain Traction Management System, much like that found on the Cherokee Trailhawk.

Rolling into the Hollister Hill Recreational Area (think of it as a ski resort for 4WD's), Jeep had some suitable challenging trails set up for us to drive. Nothing that would give a Wrangler any trouble, but some good climbs, descents and a technical section that would likely cause several thousand dollars worth of damage to your average Cute Ute.

With 4-low engaged and the "Rock" mode selected, the computers won't allow first gear to shift until nearly redline to make the most out of the traction, however the 20:1 Crawl ratio was not quite as impressive as it sounds on paper as we clipped along at 12kmh at only 1,500 rpm. Regardless, the little Renegade attacked rough terrain quite happily, climbing up a 20-deg grade, lifted its wheels on the technical sections, flopped into a mud bath and handled all challenges with relative ease, other than a little tire slip. But never was the Renegade held motionless.

Rolling over a steep embankment and crawling down a 31-deg slope was not as simple as it should have been though. The Hill Descent keeps the Renegade at a painfully slow 4kmh and with only a split seconds warning, the gauge cluster announced that the hill descent system was overheating, then promptly shut itself off, sending me into manual mode. To the Renegades

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# SPECS:

**MSRP: \$19,995**

**Price as tested:** \$31,145 (Trailhawk)

**Engine:** 1.4L Turbo Inline 4-cylinder, 2.4L Inline 4-cylinder

**Power:** 180 hp, 175 lb-ft (2.4), 160 hp 184 lb-ft (1.4L)

**Transmission:** 6-speed 2.4L manual, 9-speed automatic

**Curb Weight:** 1,583 kg (3,490 lb)

**Wheelbase:** 2,570 mm (101 in)

**Ground Clearance:** 220 mm (8.7 in)

**Approach Angle Deg:** 30.5 (Trailhawk)

**Departure Angle Deg:** 34.3 (Trailhawk)

**Ramp Breakover Angle:** 25.7 (Trailhawk)

**Wading Depth mm (in):** 483 (19) (Trailhawk)

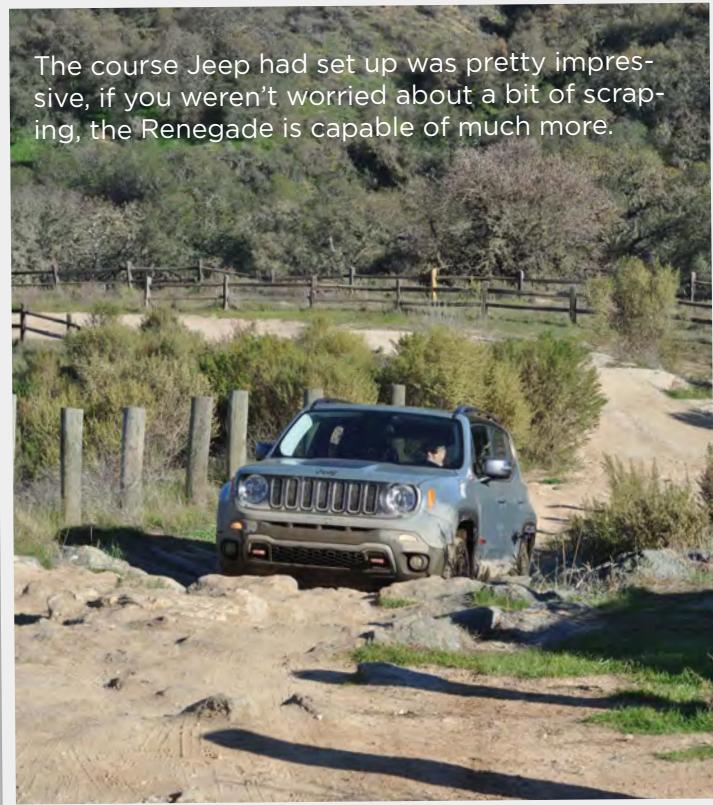
**Tow Capacity:** 907 kg (2,000 lb) (2.4L)

**Fuel Efficiency (L/100km):** TBD

defense, journalists had been hanging off this sheer drop for the better part of the day for the last week, so I can't say I blame it. It would just be nicer to have a little more warning when your lifeline decides to snap.

Despite this short shot of adrenaline, the Trailhawk's off-road prowess really did impress me, and Jeep actually went easy on all the inexperienced journo's who don't hang a 4WD up on

The course Jeep had set up was pretty impressive, if you weren't worried about a bit of scraping, the Renegade is capable of much more.



two wheels all that often. With a good set of rock rails and not worrying about a bit of scuffing on the bumpers, the Renegade could easily give many of the new 4WD's we test a run for their money.

So, is the Renegade the answer to the long extinct Suzuki Samurai? Is it the proper mini 4WD that we have been without for over a decade? Well, yes and no. The Renegade is not going to be able to conquer terrain that the Samurai can handle, however it will come quite close. On the other hand, the Renegade also adds much more versatility with four doors, four proper seats for adults, and a myriad of on-board features that an old Suzuki could never provide. The Renegade is comfortable, quiet and efficient yet gives you the same fun and open-air experience.

To properly gauge the Renegades place in the modern world, you must look at today's small 4WD's. There really isn't much competition, only the Renegades older brother, the Cherokee, and the Land Rover Evoque. I like this vehicle more than both of these bigger 4WD's, it supremely capable for its size (and era), even better than the Evoque and maybe the Cherokee Trailhawk, and can be had for a fraction of the upscale Land Rover's price. The Renegade is just what the Canadian market needs, a small, fun and affordable mini 4WD with real capabilities.



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**INSTALL**

# Who's the **BOSS**



**Toytec's BOSS 2.5-in  
lift for the Tacoma**

Story and photos by Budd Stanley

**W**ith a new year comes new projects, and one of the hottest vehicles to be adapted for trail use (other than the obvious Jeep fleet) is the Toyota Tacoma. The modern Taco is quickly becoming the modern go to weekend wheeler, much like its own predecessor nearly two-decades ago. A walk around the SEMA show taught us that there is a lot of attention being given to the venerable Taco, now that used examples are starting to fall in resale value.

With so many companies beginning to concentrate on the Taco, we decided we needed to start building one of our own. The starting point is a 2008 crew cab TRD Off-Road that not only has a manual gearbox, but also comes already equipped with an electronic locking rear differential as part of the TRD package. The owner already has a dedicated trail rig, but as time goes on and as the trail rig suffers the consequences of the obligatory abuse, the Taco has been called upon to get him through the bush on more than one occasion.

As such, the Taco has been upgraded with Toyo MT tires and a modest leveling kit that makes use of spring spacers. However, this setup upsets the handling, especially when towing, and produces a ton of bounce. And now, with over a decade of wear and tear, breakdowns and metal fatigue, his trail rig is on its deathbed. The Taco will soon have to play double duty as a daily driver and weekend warrior.

Our goal is not to go completely insane, but to modestly increase the Taco's all-terrain capability while not destroying its handling and ride comfort as a daily driver. Step one, get rid of those spacers and put a proper lift into the Tacoma to slightly raise the ride height for better clearance and bigger tires, yet not upset the handling characteristics of the Tacoma.

To do this, you want a suspension system that has been precisely tailored to the vehicle. There are two ways to do this. Find a massive corporation that still has enough passionate leaders to dismiss the bean counters and board members from telling them not to do a massive amount of R&D for each model kit. Or find a specialist who just works on one brand, or even one

model. Someone who has so much experience with a specific vehicle that they have thought of absolutely everything. For us, the choice was simple, Toytec is just such a company, dedicated to developing off-road parts for Toyota 4WD's.

ToyTec's all-new BOSS suspension system was just what we were looking for. The adjustable front Coilover is designed with a noticeably larger 5/8-in nitro steel shock shaft which is much more corrosion resistant than chrome plating and is valved specifically to the Tacoma. The threaded Clear-Blue Chromate zinc plated steel shock body is adjustable from 0 - 3-in of front lift height and can be fine tuned to level the Tacoma side to side and front to back. Each shock has a 200 psi gas charge and is dyno'd before it ships. The upper mounts and adjustment rings are machined from 6061-T6 Billet aluminum and are then anodized black to prevent corrosion. The kit also comes with a long handled spanner wrench for coilover adjustment.

The front springs are procured from Eibach, which we've come to love on other projects and are factory pre-loaded to yield approximately 2.5-in of lift. An additional 2-in of lift is put into the rear with the aid of an add-a-leaf spring for both rear spring packs.

While the shocks and add-a-leaves impressed us, the addition of spacers for the skid plate and sway bar go the extra distance. The kit also adds front differential spacers to drop and ideally align the front diff to guard

against any vibrations or misalignments due to the lift. All parts are 100% made in the U.S.A.

The front coilovers came preassembled and the craftsmanship of all the parts was very high. The whole job was done in about three hours of work time with a couple of friends and the luxury of a two-post lift. The install went very smooth, but the instructions could use a couple more photos (especially the rear spring) and be a little easier to read. Luckily, we know the Taco pretty well and Toytec does have all installation manuals available online.

A first shakedown of the new suspension yielded surprisingly good results. While firm, the new kit seemed to actually increase on-road handling and all but abolished vibration and bounce. After three weeks of breaking in, both on- and off-road, the suspension has softened up, but the rear add-a-leaf and proper alignment shims really has increased the ride quality of the Tacoma. Only a slight amount of front adjustment was needed. Toytec told us that every 1/4-in thread change on the coilover will yield approximately 1/2-in of lift, and we didn't even need that.

All suspension parts are working harmoniously and there are no squeaks or rattles to be heard. Our only real issue, those Toyo's are looking a little small now.

**Toytec BOSS Suspension System**  
[www.toyteclifts.com](http://www.toyteclifts.com)  
**\$1,229.99 CAD**



**1** The kit as it was removed from the box. We were quite impressed with the quality of the parts and materials. Preassembled coilovers also make installation easier.

**2** Toytec recommends that you make record a measurement from the centre of the front hub to the bottom of the fender. This will allow you to know how much the vehicle has been lifted, allowing you to adjust the final lift height. Raise the vehicle (we were lucky enough to have a lift), and remove the wheels.

**3** We started at the front by pulling the front skid plate and the top sway bar links, then loosened and removed the sway bar mounts from the frame.

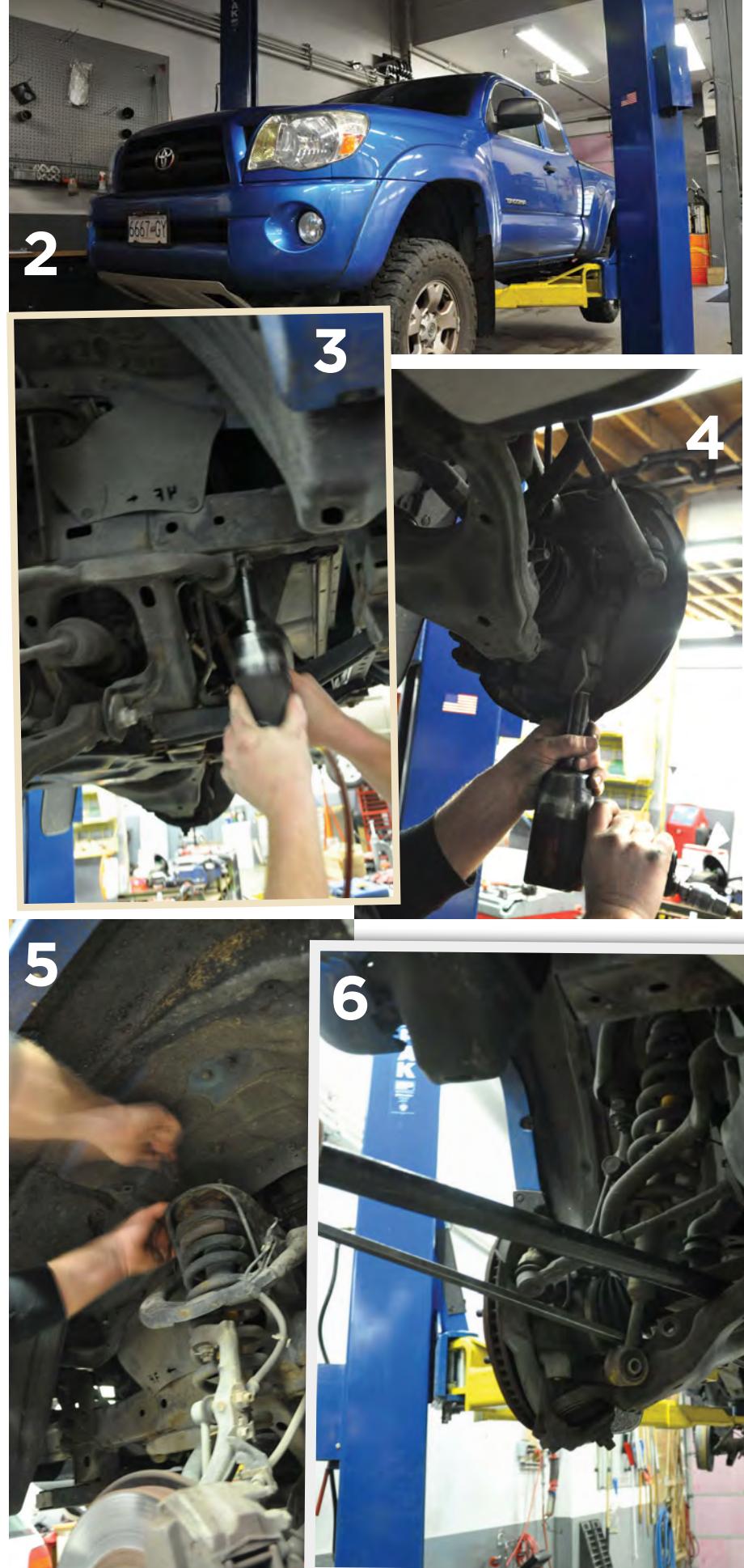
**4** We then removed the lower shock nut and bolt and two lower ball joint bolts to separate the ball joint from the spindle.

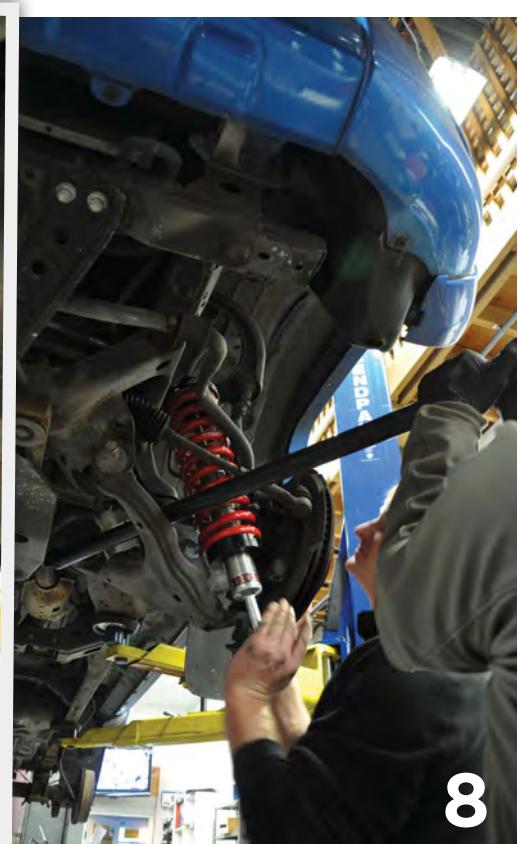
**5** Out come the three top nuts holding the stock coilover to the shock tower.

**6** Being careful not to overextend and pull apart the inner CV Axle joint, move the spindle/hub assembly out of the way so the coilover can be evacuated down between the steering arm and axle.

**7** With the suspension out, we move to the differential, supporting it with a stand. Removing the two mounting bolts, we lower the diff slightly to accept the 1-in spacers between the two front differential supports and front cross-member. With new Grade 8 bolts and nuts (making sure to reuse the factory washers), we tighten up the hardware to factory specs and move back to the suspension.

**8** With some finesse and a little help from a large pry bar, we can slide the new coilover up into the top mount and get a couple nuts to hold it in place. With additional help from the pry bar on the lower control arm, we align the lower mount to accept the large nut and bolt.





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**9** Using the factory hardware, we install the sway bar relocation blocks to the frame. With the supplied bolts and washers. We reinstall the sway bar to the new blocks and attach the end links. This is vital for the coilovers to clear the sway bar as pointed out.

**10** Reinstall the lower ball joint bolts, then duplicate the process to the opposite side of the vehicle. Be sure to torque all hardware to manufacturer specs.

**11** To install the front skid plate, we fitted the OEM bolts on the front and the supplied longer bolts with washers and square skid spacers on the rear. Toytec say that some skid plate trimming may be required, however we had no issues.

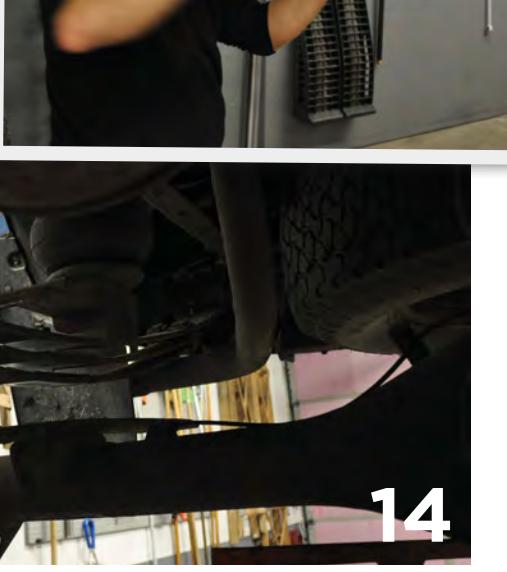
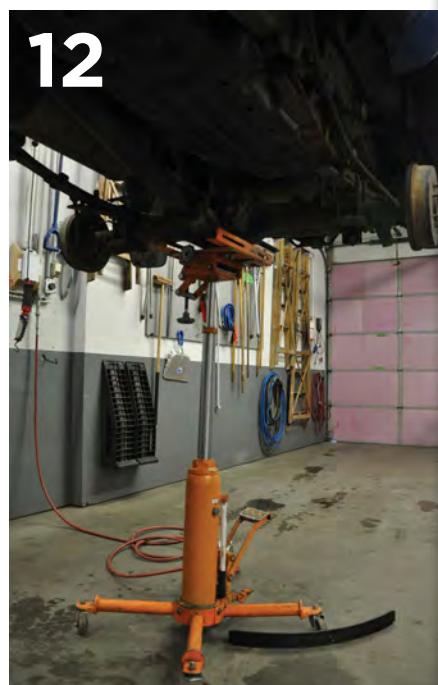
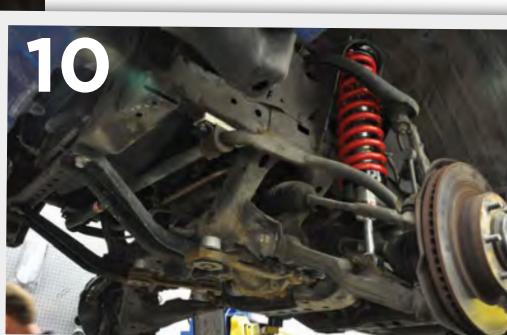
#### REAR ADD-A-LEAF

**12** To make lowering the axle easier, we disconnect the E-brake cable from the rear drum brakes and throw an axle stand under the axle for support. We then remove the shocks on both sides, easy as it is just two bolts on each side.

**13** We then remove the axle U-bolts, axle plates, bump stops, and all hardware on both sides. Slowly lower the axle so there is enough room between the spring perch and spring to install the add-a-leafs. Be careful not to overextend the rear soft brake line leading from the axle to the frame!

**14** To keep the spring packs from exploding, we put two large C-clamps on each side of the spring centre bolt.. after learning the hard way. We then loosen and remove the bolt. A pair of vice grips may be needed to hold the centre bolt head from spinning while removing the nut.

Continued on page 78



**14**

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<b>1986.5-1997 D21 Hardbody PU 4WD</b>		
1.5-2"	Complete Kit w/Upper Arms	\$339.95

### TOYOTA



<b>2007-2014 Tundra 4WD</b>		
2.5-3"	Front Leveling Kit	\$129.95
2.5-3"	Leveling Lift Kit w/rear blocks	\$169.95
4.5"	Complete Kit w/2.0 Rear Shocks	\$1249.95
6"	Complete Kit w/2.0 Rear Shocks	\$1299.95
<b>1999-2006 Tundra 4WD</b>		
2.5"	Leveling Lift Kit w/rear blocks	\$269.95
<b>2005-2014 Tacoma 4WD</b>		
3"	Leveling Lift Kit w/rear blocks	\$249.95
4"	Complete Kit w/2.0 Rear Shocks	\$999.95
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2.5"	99-04 F-250/350 SD (4WD)	\$309.95
2.5"	03-13 Expedition (4WD/2WD)	\$169.95
1.5"	83-97 Ranger/Bronco II (4WD/2WD)	\$129.95

### TOYOTA MODELS

2.5-3"	07-14 Tundra (4WD)	\$129.95
2.5-3"	07-14 Tundra (2WD)	\$99.95
2.5"	99-06 Tundra (4WD)	\$269.95
3"	05-14 Tacoma (4WD)	\$249.95
2.5"	95.5-04 Tacoma (4WD)	\$239.95

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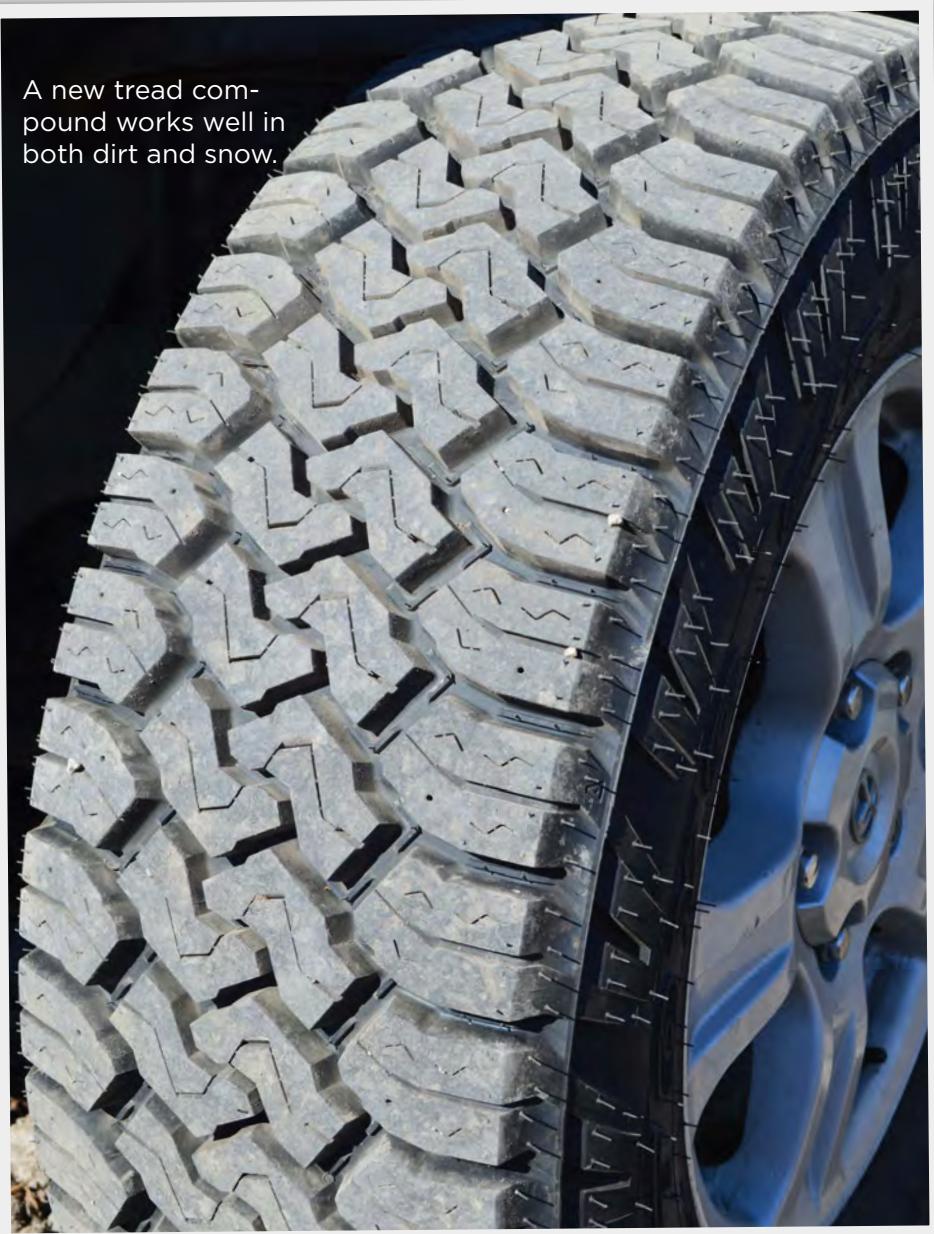
**REVIEW**

Story and photos by Bryan Irons

# All-Weather All-Terrain

Toyo Open Country C/T





### **Mom always told us “good things are worth waiting for”.**

Needless to say, it's really starting to bug us how often she was right. We have been waiting eons for Toyo to bring something new to the table, and not because we didn't like what they currently produce, quite the opposite; we want to see how much better it could get.

Toyo's previous generation of the Open Country group included the beloved AT II and MT offerings, which proved that a mud tire or aggressive all-terrain doesn't have to be loud, oblong, or wear out faster than a pair of tighty-whities at a chili eating contest. What we were jonesing for was a tire we could run all year with the

ruggedness of the MT, the long life of the AT II, the round carcass Toyo is known for, plus that little snowflake symbol. Toyo must have heard our whining.

The Open Country C/T was meant for Canadians who actually use their truck for work and play 12-months of the year. All C/T tires come equipped with a tough three-ply sidewall and new tread compounds able to not only grip onto icy surfaces but also live with hot summer temperatures that would normally melt a typical snow tire.

Some of the same characteristics we love about the other Open Country specimens are here in the C/T too; rock and mud ejectors, deep lugs with wide spacing,

wrap around sidewall tread among others. They are pinned for studs if you feel they are required as well.

We strapped a set of LT275/65R18's to a well-used 2012 Toyota Tundra for testing. The truck gets used for highway miles to and from work as well as hauling and towing duties around the farm. Days off are spent in the truck finding new fishing holes or just exploring the outback. Mounting and balancing didn't show anything out of the ordinary and after a few break-in miles, highway drives proved smooth and controlled. The old "P" series passenger car tires that were on the truck could not offer the stable feel or firm han-

dling the C/T's "LT" (light truck) 1,550 kg load rating tire provides. There was a slight increase in road noise but we attribute that to the old tires being as soft and bald as a race slick.

We all know the dirt is where it's at for us and the Toyo did not disappoint. The large voids ate up the soft soils and sand while the sidewalls rejected any foreign intrusions. On hard pack FSR's (forest service roads) with a light coating of mud, the tires did well to dig deep and gave us the traction we needed. The deep muck will require a stern lashing of the skinny pedal to keep the voids clean; this is not a MT, but will get you through.

Snow and icy conditions is where Toyo said they did their homework. We picked this set up in the middle of summer so we had to sit on our hands a bit before we could test them out. The Toyo's felt on par with other AT tires on hard ice, but snowy and compact conditions are its shining point. They could get a good bite in the snow and gave us confidence the old snow radial did not. During winter storms, the truck trudged on without question and earned it's stripes.

Multiple driving conditions and terrains is part of what makes Canada so diverse, and having a tire that can cope with changing conditions are what we look for. Longevity and durability are on the radar for summer camping trips and long hauls. Winter months require the ability get to work and play in the hills once temperatures drop and the snow flies. We feel Toyo's do-all direction with the Open Country C/T tire fits very well with what we need for a year-round performer when it matters most.

**Toyo Tire | [www.toyotires.ca](http://www.toyotires.ca)**



The C/T's did surprisingly well in the white stuff.

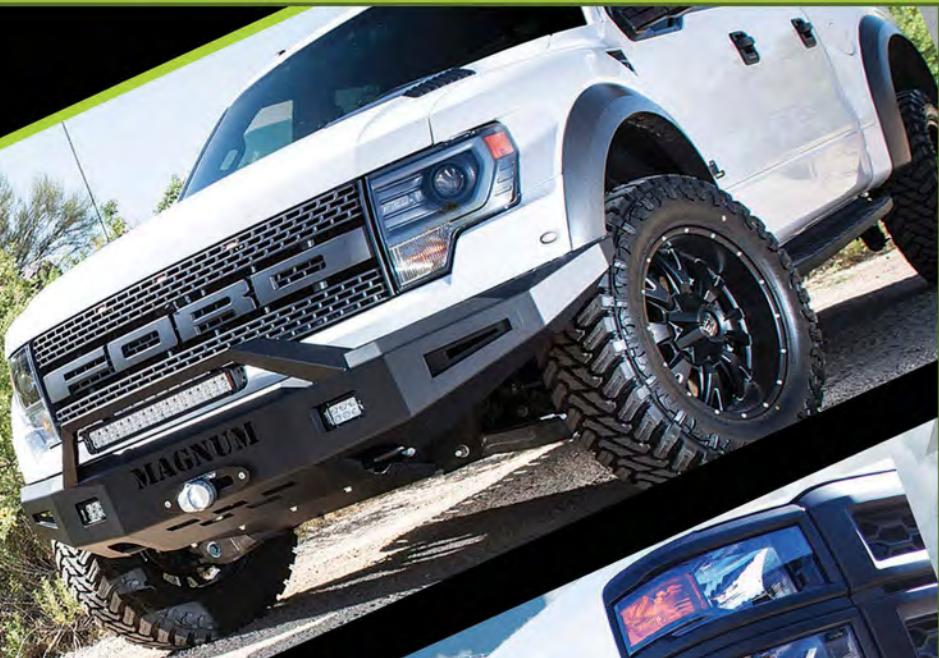


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# BCC Flex n Shine

*Story and photos by Jade Halarewicz,  
additional photos by Budd Stanley*



BCC's nearly finished KOH EMC rig was the showcase in the shop.

**WITH WINTERY WEATHER SETTING IN AND 2014 COMING** to an end, Big Country Customs was the place to be to warm up with some hot food and drink, check out some awesome rigs, some ambitious builds, get some smokin' deals on parts and watch some rigs flex it out on the articulation ramp.

The Big Country Customs inaugural Flex n Shine event was open to off-roaders of all kinds. The event was in support of the 4

Wheel Drive Association of British Columbia, who has been continuously supporting the local 4WD community. On a volunteer basis, 4WDABC educates people on safety and treading responsibly and respectfully in the backcountry, while acting as an advocate for this community. They have been working hard to build a relationship between the government and the responsible 4WD driver. This includes working on keeping trails open and seeking appropriate

areas and resources for people to enjoy this great lifestyle. All proceeds from the Flex n Shine event went to the 4 Wheel Drive Association to help with this cause.

We knew people would come out, but the support was overwhelming! We had several awards to hand out including "dirtiest rig," "I wish it was mine" and "I can't believe it still runs!" All who came to view the rigs voted for their favourites, with the main draw for a 20-in light bar, a set of Rock Sliders, a 2014 KOH DVD, a tire repair kit, but most importantly, a BCC hoodie. Our lucky winner was Aaron Cliff "Big Ern."

While the festivities continued outside, BCC opened its shop and held a mini trade show. Customers could see and touch new products and were privy to a one day in shop only sale. Taran never left the sales counter till the show was over - never. I don't even think he used the rest room. We literally had a line up through the show room. It was a great sale to take advantage of so many great products on display.

We fed well over 200 people. Enrico from Enrico's Differential Solutions showcased his BDS Dynotrac front housings, and I have to mention he brought his "A" game. He came prepared with at least ten pots of Italian goodness, such as gnocci and fresh pesto, while hot dogs and chili kept all who attended warm.

Several rigs made a run at the Articulation Ramp, with some impressive results from even mildly modified trucks. Even a German military Mercedes transport (not even the infamous Unimog) attacked the ramp with a NATO can on the back and everything. The RTI Ramp Champ however would be the red/orange Jeep of Scott Shellop with a score of 967.30.

During the event, we were able to meet new people, see old friends and enjoy a celebration of all things 4WD. We just might have to make this an annual event.

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# REVIEW



# STEALTH STORAGE

## The Rampage Trail Can

*Story and photos by Bryan Irons*

**"BUG EYED AND DROOLING"** is how we were described while motoring around SEMA 2014. Trying to gather all the latest and greatest widgets to hit the market this year is a tough job, honest! We found a lot of fluff, glitter and useless junk out there, but enough about Editors Mack and Stanley. A simple red NATO style fuel can is what caught our attention in Rampage Products booth. It turned out that the little unassuming steel Jerry can was actually a storage container. Exactly what we were looking for in fact!

A few issues back we showed you how to stick weld using just a pair of batteries and a small rats nest of cable. Since then we have been packing our cables and rods around but they always seem to get smashed, bent up or lost. We now had our solution before us! Two different designs are available and both look exactly like the standard gas can with the exception of a keyhole in the cap for locking goods away. The first style is just an empty container ready for you to fill with whatever trail gear you may need. The one that followed us home contains storage

compartments, drawers and built in tool holders to stash our trail gear in an organized manor rather then in a heap in the back.

Being the same size and shape as the standard NATO can means that if you already have a mount for a true NATO fuel can, the Trail Can will drop right in place. If not, a base is included with it. We mounted ours in the back corner of the rig and picked up a second base for mounting in the back of our tow rig as well.

The steel cans just make sense with welding gear as we can toss any hot, used rods or tools in the can without worry of anything melting or catching on fire. The compartments keep our welding goggles safe from scratches and there is plenty of room for storing scrap steel for makeshift repairs. The heavy-duty construction feels tough enough for us to drag though the woods without worry, which may happen.

Rampage has always been known for hitting the market with innovative designs and ideas. The Trail Can is just one of many that they keep coming out with to make wheeling more enjoyable. Having the Trail Can gives us one less thing we have to worry about surviving the trip.

**Rampage Products**  
[www.rampageproducts.com](http://www.rampageproducts.com)



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An advertisement for Extreme Bends Off Road Shop. The top half features the text "HARDCORE CRUISER SPECIALIST" in large, bold, white letters. Below this is a black and white photograph of a rugged off-road vehicle, possibly a Toyota or Suzuki, equipped with large tires and a roof rack. To the right of the vehicle are three brand logos: ARB, Detroit Locker, and WARN. At the bottom left is the EBI Off Road Shop logo with the address "Port Coquitlam B.C. Canada". To the right of the vehicle, the words "Jeep", "Toyota", and "Suzuki" are listed vertically. The bottom half of the ad contains the text "Fabrication • Restoration • Repair" and the phone number "1.877.299.3540" followed by the website "extremebends.com".



# TRAILFEST

**E**very summer the tiny village of Bobcaygeon, Ontario fills up with off-roading enthusiasts out to enjoy some of the province's most scenic trails; there is no weekend of the year more impressive than the August first long weekend when one hundred and fifty families invade the village for Trailfest. This event, whose roots return to Jeep Jamborees of the past, is hosted by the London and Area Jeep Owners Club and is open to four wheel drive vehicles of all makes and models with funds raised going to a variety of preselected charities. In 2014 the money raised was split between the London Food Bank, Camp Bucko, a Bobcaygeon area medical clinic, the Soldier On Fund and the Buckhorn Fire Department.

As in real estate, what separates Trailfest from other events is location, location, location! Participants get to wheel a variety of trails on private and crown land that rarely see the tread of a tire, allowing for a truly wild natural landscape. Trailfest's trails range in difficulty from mild to wild; with something for everyone's taste in trail riding whether you're looking for



a winding woods route to a spectacular lakeside lunch spot, breathtaking, steep limestone obstacles, 360 degree views atop a mountain, or slinging mud, you can do it all in two days at Trailfest.

The London and Area Jeep Owners Club boasts experienced trail guides whose goal for the weekend is to ensure that the participants are having the best possible time. For the newcomers, there is a 101 course that combines some technical teachings, and some practical learning with the unwritten etiquette "rules" of off-roading before heading out on a trail ride to put some of that theory into practice and catching some killer views.

Saturday night there is a charity meal and a variety of games with great prizes to test your skill! Some of them rely purely



on the technical aspects of the Jeep such as the RTI ramp, but don't think you need to be "built" to participate in the teeter-totter, blindfolded driver course, or 2014's newly added crowd pleaser "big balls" where the drivers race to put a giant beach ball in a kiddie pool with their Jeeps!

A brief itinerary of the weekend resembles Friday night and Saturday morning registration, trails all day Saturday followed by food, games and entertainment, trails all day Sunday, supper, and closing ceremonies where the sponsor-donated prizes will make even the most bountiful of Christmases pale in comparison!

*Registration is now open at [www.trailfest.ca](http://www.trailfest.ca) - and feel free to email [info@trailfest.ca](mailto:info@trailfest.ca) for any other inquiries about the event!*



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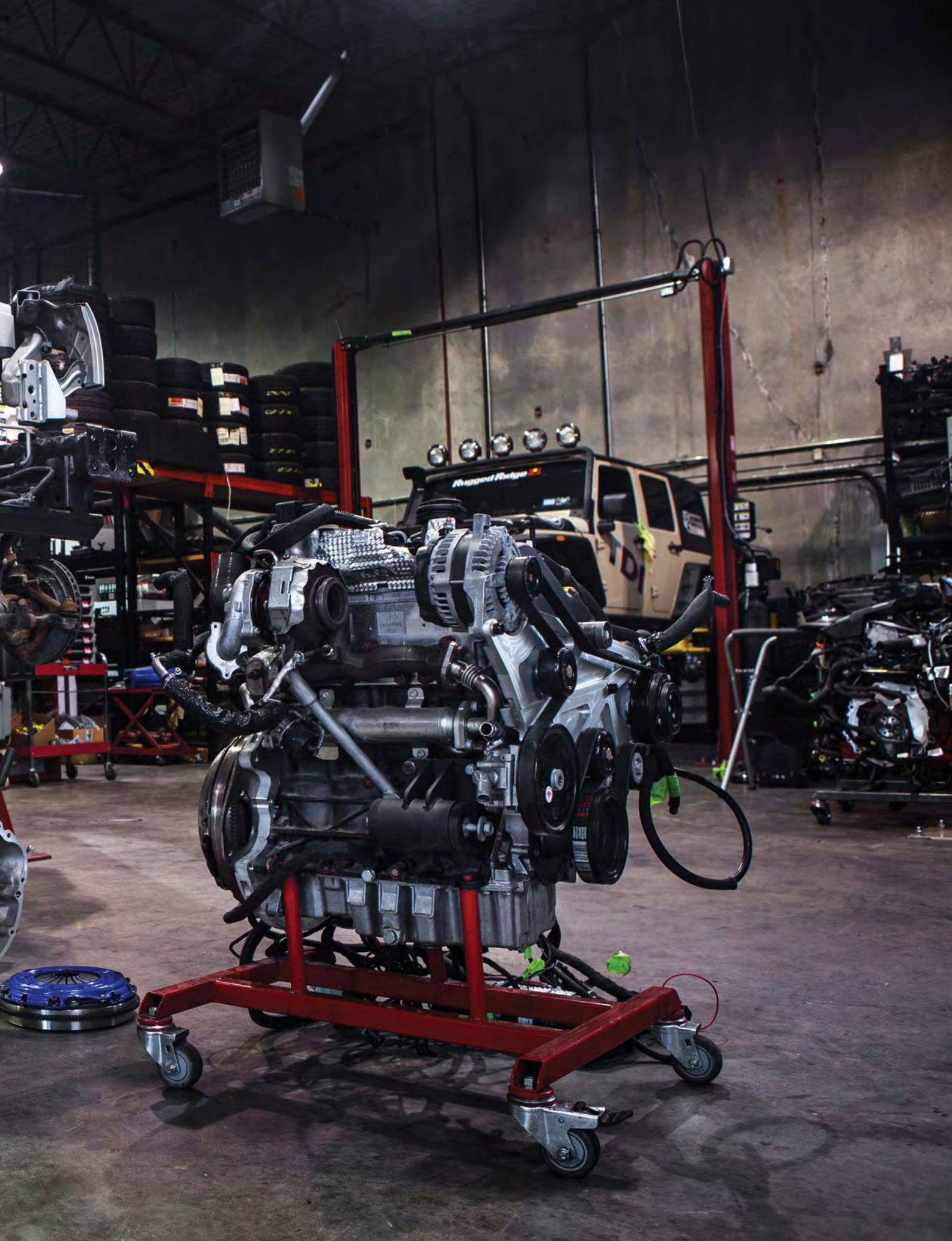
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**FEATURE**

# Marriage Made in Heaven

**COTY BUILT JK GETS A TDI HEART**

*Story by Norm Larch, photos courtesy of Andrew Holliday*



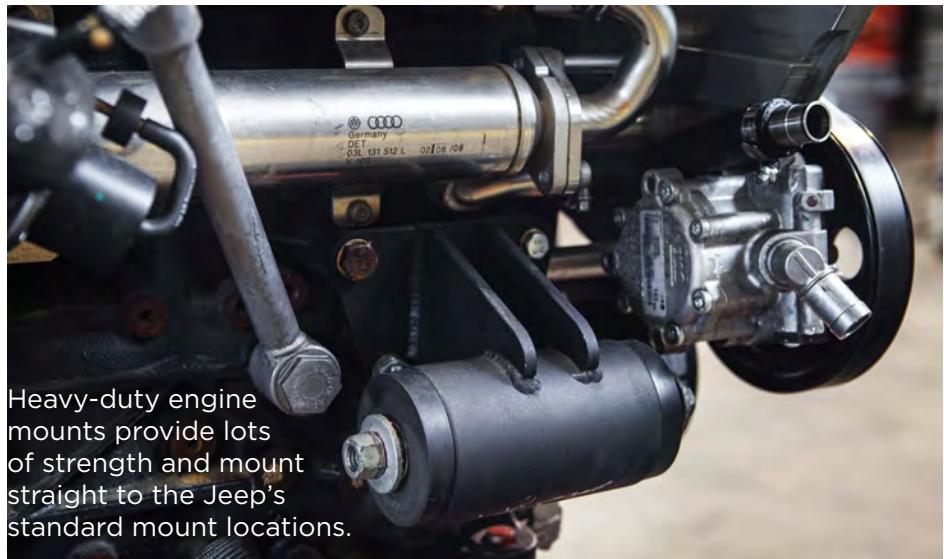


A full custom billet Truss Member allows all the Jeep ancillaries to be mounted onto the TDI powerplant.

**O**ne of the main lures of the Jeep is how it can be transformed to meet the needs of its owner. This brand embraces all extremes, from tubular rock crawlers to outback expedition rigs to soccer mom duties.

When we caught up with Marcel Horn of Coty Built, he expressed a similar sentiment as to why people look towards diesel as a power plant. "We have requests to supply engine conversion kits for extreme outback usage where adventurers are taking their Jeeps deep into the jungles of South America where fuel is hard to come by. We also have retired Vets that spent their entire life surrounded by Jeeps and look for an ultra economical commuter that can still tackle the trails on weekends. The Volkswagen TDI can be calibrated for extreme fuel economy or for a more potent torque output that will attack deep mud and steep inclines. The flexibility of the newer Volkswagen TDI engine control module is what makes TDI a perfect match for Jeep as it can cater to nearly any enthusiast wishes."

Coty Built is in their final stages of

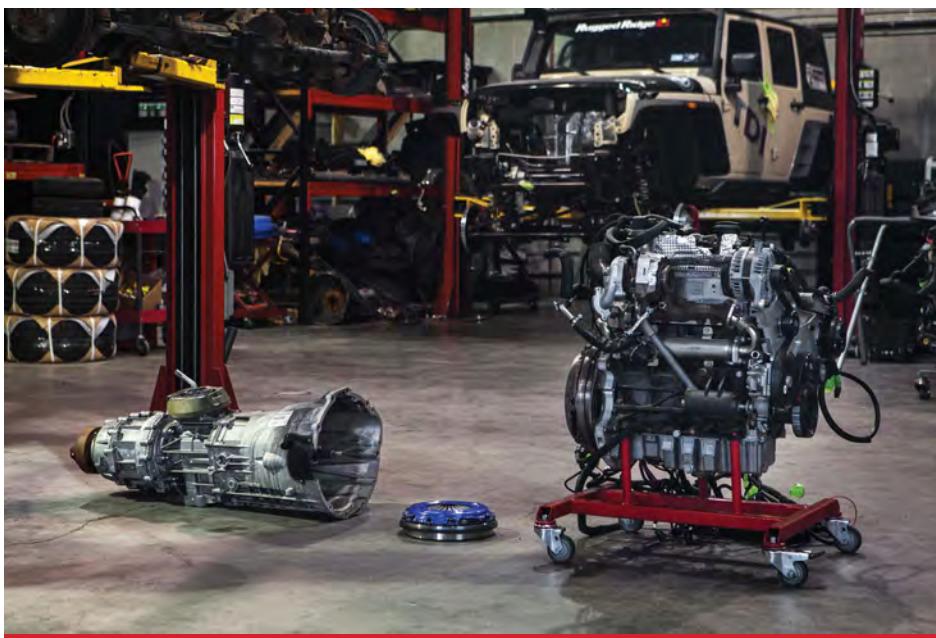


Heavy-duty engine mounts provide lots of strength and mount straight to the Jeep's standard mount locations.

releasing the JK and JKU program, which is anchored by the 2009 to 2014 2.0L Volkswagen TDI. On the engine stand, this engine has a massive girth but without the weight penalty. Unlike the 1.9PD (Pump Duse) TDI used in the Coty Built YJ/TJ and XJ applications, the current 2.0L TDI has adopted a common rail design. As such, it uses a belt driven high-pressure fuel pump to feed the injectors. The alu-

minum head uses a cross flow design with two intake ports and two exhaust ports per cylinder and 16 valves driven by dual camshafts. Volkswagen created this evolution of the TDI to reduce acoustics and improve consumption while delivering more performance.

Horn states that in Europe, the 1,633 kg (3,600 lb) Volkswagen Passat variant received a 170 hp version where here in



The lovely couple being married by a Spec high performance clutch.

North America all versions are 140 hp and 236 ft-lb stock.

At the heart of the Coty Built conversion package is their unique Truss Member concept which houses the OEM Jeep engine accessories and belt drive in their near factory locations allowing them to be driven off the TDI motor thus limiting the conversion requirements to a VW long block and gas pedal. This system simplifies the general under hood architecture of the conversion and keeps things straightforward for field service and vehicle maintenance. The Truss Member, when conceived for the 1.9PD TDI, also served as the engine mount as it replaced the Volkswagen accessory bracket streamlining the installation.

Coty Built creatively adapted their original Truss Member concept to accommodate the OEM Volkswagen belt driven fuel pump found on the 2.0TDI and with their updated Truss design, they were successful in pushing the Jeep engine accessories out in front of the engine. With the old 1.9PD TDI package, builders would weld on mounting pedestals to the Jeep for the truss to sit down on. With the JK 2.0TDI solution, a pair of bolt in mounts is used to fix the TDI engine to the original frame mounts allowing for an installation that requires no welding.

With Coty Built's transmission bell housing adapter, the Jeep flywheel

and clutch are retained and the factory driveline geometry is not manipulated. This is good news for anyone with sights beyond the TDI conversion, as most every aftermarket upgrade will not be impacted. Original adapter plates were water jet cut and profiled on the CNC mill. Today the popular applications are cast aluminum; increasing production capacity and reducing material waste.

Horn states that there are only two alterations to the Jeep's hardware required. The Jeep transmission bell housing needs to be cleared to accommodate the Volkswagen starter. The installer needs only basic hand tools to cut a notch in the bell housing and install the supplied cover plate. Secondly, the factory Jeep fuel system needs to be converted from a returnless system to a return. This requires the fuel tank to be lowered, a fuel line pulled to the back and the fuel pump housing altered, then the tank reinstalled.

Coty Built's parent company HPA Motorsports has relied on Spec clutches for all its twin turbo Volkswagen/Audi builds and a call into Spec was made to upgrade the Jeep clutch. Spec has a great range of friction materials that increase grip for the anticipated bump in torque without losing the OEM pedal feel.

With the return fuel lines plumbed and the gearbox cleared, the Jeep flywheel, Spec clutch and NSG370 6-speed

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The Coty Built Truss Member retains all domestic Jeep belt driven accessories and the Transmission Adapter Kit keeps all Jeep hardware and geometry from the gearbox back.

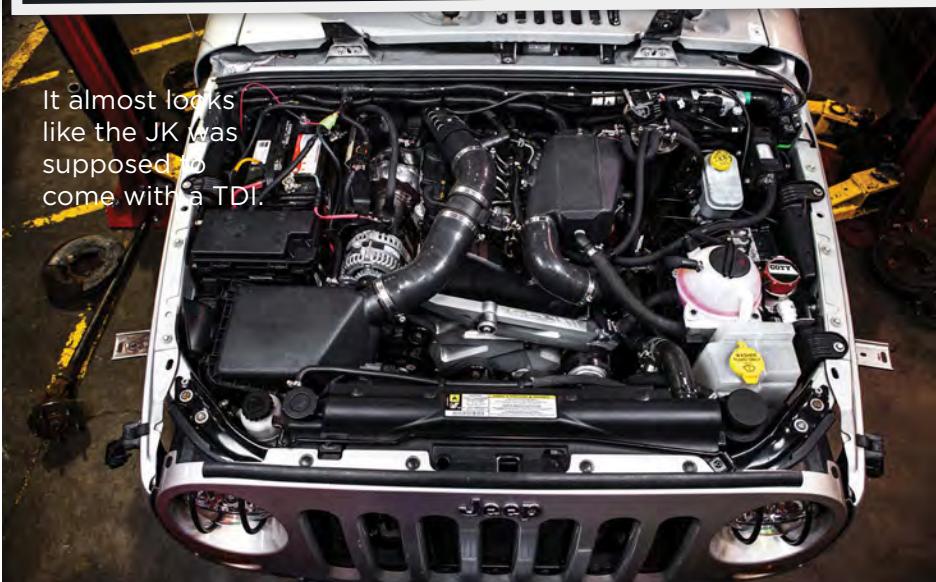
Installation packages available for TJ, YJ, JK and XJ chassis.

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Only slight modifications are required, simply cut a bit of bell housing to fit the starter and Coty Built supply a cover to be riveted in place.



Some highly specialized parts and a bit of time in the shop, you've got yourself a diesel JK.

gearbox are mounted onto the 2.0TDI. Coty Built has prepared a plug and play electrical harness, which is tied into the JK's chassis. The entire power plant assembly is hoisted up and positioned in place and the factory engine mount bolts secure the TDI and transmission back in place.

For this build, Coty Built brought in the 170 hp engine from Europe and is preparing it for life in the BC backcountry. As such, this rig is slated to see some big tires, tall gearing and a lot of trail ready parts. The team will omit the Catalytic converter as they look for maximum performance from the 2.0L. Sights are set on 400 ft-lb of torque; we will see in time if this is realizable. The factory TDI applications used a large front mounted air-to-air intercooler. Horn states that with a typical 120 kmh max highway speed, the TDI was better served with an ultra short boost track cooled by a liquid cooled after-cooler. Throttle response will be instantaneous and air intake temps will be better controlled in off highway usage where air speed over the front grill is minimal - unless you live out in the open plains. With the package installed, the factory Jeep engine bay peripherals are all still in place and the package uses all the available real-estate. It looks near factory and it's also clear why this would not be an ideal fit for the smaller TJ and YJ engine bays.

Horn hopes that engine and conversion hardware will set a builder back around \$10,000 once the JK program materializes. It has proven to be a good value for the YJ/TJ owners where fuel consumption drops by 2/3rds.

The facility in Langley BC features in-house fabrication, a CNC machine shop, All-Wheel-Drive dyno and a full staff capable of tackling almost any task put before them. Good thing as there will be a mountain of parts and upgrades thrown at this JK outside of the TDI conversion to prepare it for the 2015 Easter Jeep Safari in Moab, UT.

**Follow along in our next issue as we continue with the trail prep of the TDI Wrangler.**



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Take advantage of some of the Kawartha's most scenic landscapes on Trailfest's pristine and exclusive trails. You and your passengers will take trails that truly test your driving expertise. Trails are categorized by their overall level of difficulty, and feature a variety of terrain conditions. At Trailfest, you'll find out how best to handle the trails from experts who really know how to drive them. For those with no previous off-road experience, attend Off-Road 101 at Trailfest for a helpful introduction before you hit the trails.

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**FEATURE**

Story and photos by Budd Stanley

# DETROIT TRUCK CITY

4WD's headline the North American International Auto Show

Yes, Nissan will continue the PRO4X trim with the new Titan.

The surprise introduction of the next generation Ford GT most certainly made the biggest splash at the 2015 North American International Auto Show, however this year would be the year of the 4WD in Detroit. Yes, if NAIAS is any scope of the current state of the automotive market (and it usually is), the truck is king. With no less than nine 4WD vehicles having the sheets pulled off them for the first time, we were left scurrying about in a mad dash to try and cover all the new 4WD candy on display.

The NAIAS is one of the three largest and most prestigious new car auto shows on the planet, but while fancy



supercars, luxury sedans and economic runabouts garner most of the attention at Frankfurt and Geneva; the 4WD is the darling in Detroit.

This year would prove one of the biggest on record for our chosen field, and it was a good thing we were on hand to cover all the big name launches. Going into the first media day, there were only two vehicles we knew we wanted to be in attendance for. Nissan were pulling the wraps off the long awaited second generation Titan, as was Toyota showing their third generation Tacoma. We knew both Ford and Ram were up to something and our dreams came true as both manufacturers surprised us with high



As will Toyota, with their TRD Off-Road Tacoma.



Here is a name that needs no introduction, and yes, the angry Ford will live on.



The Raptor won't have things all its own way as Ram rebels with a desert runner of its own.

performance off-road specials, one due to hit the market in a matter of months.

However, it wasn't just production vehicles that were monopolizing our attention. Several truck, off-road and AWD concepts also made us stop in our tracks and take a second look at what untraditional truck maker's thought of the genre and what its future may hold. GM showed their ZR2 concept Colo-

rado, hoping to gauge public opinion on the aggressive trim level, while Hyundai also want to judge what people think of their unibody pickup concept. There was no shortage of interesting vehicles to capture our attention and keep us on the run to the next big reveal. So with that, we give you 4WD Magazines full in depth coverage of all things 4WD and off-road at this years NAIAS.

**FEATURE**

*Story and photos by Budd Stanley, additional photos courtesy of Nissan*

# TITANIC



# CHANGE

## NISSAN MAKES BIG CHANGES TO FULL-SIZE TITAN



I don't need to tell you that the full-size truck market is one of the hottest segments in the automotive industry at the moment. For the last couple years, Ford, GM and Ram has been slugging it out for full-size supremacy, introducing alternative power and drivetrains, unheard of levels of comfort and convenience and more tech than was required to get to the moon. With the Toyota Tundra getting a refresh last year, there was only one missing player in the "big boys club" that has yet to see any real development – the Nissan Titan.

With ghostly white sheets draped over three rather large vehicles in Nissans booth at the North American International Auto Show, the world's press was introduced to the 2016 Nissan Titan. Carlos Ghosn, Mr. Nissan-Renault himself, delivered the introductory speech, confirming that the new Titan would sport a fresh new look and make use of an unconventional partnership between Nissan and Cummins, but we'll get back to that a little later. Nissan knew they needed something big to take on the EcoBoost's, EcoDiesel's and EcoTec's of the world, and deliver big they did. While we were expecting just the second generation of the outdated Titan, Ghosn hit us with the biggest most capable Titan ever, the Titan XD.

XD isn't just a trim level; it's a whole new member of the Titan family. While the domestics have half tons and three-quarter tons, think of the XD as a sort of half-ton and a half, a 5/8ths ton if you will. Nissan noticed that with all the three-quarter tons moving into stratospheric capabilities, a rather large window of opportunity opened up between the half and three-quarter tons, for those who may need 5,400 kg (12,000 lb) towing capability, but just don't need 13,600 kg (30,000 lb).

The most obvious changes come in the new design and we have a bold new statement from Nissan. While most manufacturers would keep the design safely reminiscent of the outgoing generation, Nissan knew that the sharp lines of the Titan were a little too common to the eye. As such, we now have a body that is more shapely formed, making use of aerodynamic aids and more pronounced stance.

Unfortunately, both Japanese half-tons suffer from a public stigma that they lack superiority, more common with the Americans. Even though the Titan is designed, engineered and built in the U.S., it still doesn't quite get the respect it deserves. The Titan really doesn't have anything to be ashamed of here, big power, big torque, big capability and lots of space makes it a winner in my books before it even makes it to market. However, focus groups still think the Titan looks too small, and as a result, Nissan is forced to stick out its chest a little more than it should to help overcome that stigma. This comes to fruition with a high hood line that creates an overly large front grille and headlights to portray a larger more masculine shape. I think it looks like they are trying a little too hard, but other than this design characteristic, I think they've done a great job.

The interior gets an equally handsome upgrade, most notably in the quality of materials, but in both build quality and design as well. Nissan say their inspiration came from hunting jackets, and one look will see the resemblance. The seats are very comfortable and feature Nissan's zero gravity technology. What that means is that the shape of the seat simulates the position the human body naturally takes in zero gravity. This reduces pressure points and holds the body in a neutral position, which helps combat fatigue.

Design and features aside, what really



Not to worry, a PRO4X trim level will return.



makes the new Titan XD standout is the adoption of an all-new Cummins 5.0L twin-turbo V-8 diesel powerplant. While the big diesel will no doubt be much more civil than older Cummins products that deafened anyone within a one-block radius, any question there is a diesel under the hood will be answered with the giant "Cummins" badge dominating the front fenders, another show of force, or "my belt buckle is bigger than yours" type proclamation.

Chest thumping aside, Nissan say that the new Cummins makes use of a compacted graphite iron cylinder block, forged steel crankshaft, high-strength aluminum alloy heads, and composite valve covers to offer

maximum durability in a lightweight package. These features, along with dual overhead camshafts, also contribute to reduced noise, vibration and harshness characteristics. The engine is fed by a high pressure common rail system in conjunction with twin, two-stage sequential turbochargers, designed to provide optimum power throughout the rev range to produce 310 hp and 555 lb-ft.

The frame has been designed specifically for the XD, allowing drivers to haul up to 907 kg (2,000 lb) and tow up to 5,400 kg (12,000 lb) both safely and confidently. Some smart thinking also went into the frames construction as an integrate fifth wheel trailer hitch  
**Continued on page 75**



Nissan say that the interior was fashioned from a comfortable yet rugged hunting jacket.

## SPECS:

**MSRP:** TBA

**Engine:** 5.0L Twin Turbo V-8 Diesel

**Power:** 310 hp, 555 lb-ft

**Transmission:** 6-speed automatic

**Curb Weight:** TBA

**Wheelbase mm (in):** 3,850 mm  
(151.6)

**Ride Height mm (in):** 236 (9.3)

**Approach Angle Deg:** 21.4

**Departure Angle Deg:** 24.2

**Ramp Breakover Angle:** 20.7

**Wading Depth mm (in):** TBA

**Tow Capacity:** 12,000+ kg est.

**Fuel Efficiency (L/100km):** TBA

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**FEATURE**



STORY AND PHOTOS BY BUDD STANLEY

# FRESH TACO

Toyota breathes new life into Tacoma



The new front design took a little getting used to, but we think it's a winner.

For quite a while now, Toyota and Nissan have had a complete monopoly on the mid-size truck market. If you wanted anything smaller than a half-ton, your choices were simple – Frontier or Tacoma. As a result, we've seen very little change in the Tacoma for over a decade now, other than some front fascia and infotainment upgrades. And really, this was fine as the Tacoma was a pretty good truck to begin with. However, the return of the Colorado/Canyon twins has shaken up the segment in a big way, all of a sudden, pretty good just doesn't cut it anymore.

Well, with competition comes the will to adapt, survive and overcome, and Toyota's answer to its first real threat in four years just made its debut stage right at the NAIAS in Detroit. The 2016 Tacoma now sports a conservative redesign that gives the front and rear fascia's a healthy shot of modernization, yet you can still see the trademark silhouette of the current Tacoma lurking beneath.

While the designers have gone easy on the exterior, the interior is a different story. The dash receives a complete makeover that is both modern and good looking, yet beautifully simplistic at the same time. An upgraded Toyota infotainment system dominates the top of the centre stack handling all audio inputs, while easy to decipher HVAC controls reside one step down.

Stepping into the Tacoma reveals that Toyota has made a good thing even better. The already solid build quality takes a step in the right direction, as all panels feel strong and well supported, with a noticeable upgrade in material quality.

While the new Tacoma may look like its biggest changes are only skin deep, there is a lot more happening beneath the sheet metal than just a makeover. The frame has been redeveloped with extra rigidity and strength despite lowering the weight. Weight savings has also been implemented into the body with the use of high strength hot stamped steel.

The biggest change comes at the heart of the Tacoma. Gone is the gas guzzling 4.0L V-6, replaced with a 3.5L Atkinson cycle V-6 equipped with Toyota's D-4S injection technology that utilizes both

direct and port fuel injection. A 2.7L four-cylinder engine will also be available. Both engines will be paired to a new six-speed automatic transmission with electronic shift or a new six-speed manual transmission.

Toyota know they have a long way to go to make the Tacoma competitive fuel efficiency wise with not just the mid-size competition, but even the ever more advanced half-ton. These new developments should ensure the Tacoma realize large jumps forward in the fuel efficiency game, matching the Tacoma's new lighter weight body and efficient V-6 to the new 6-speed automatic and manual transmissions. However, we have no hard numbers as of yet.

The new Tacoma will be available in four grades in both 4x2 and 4x4 configurations and Toyota say each grade will have its own personality and unique look. These include the SR5, TRD Sport, TRD Off-Road and the Limited. What we're interested in is the TRD Off-Road edition, which will sport much the same equipment as the current TRD but with retuned springs and Bilstein shocks and Locking Rear Differential.

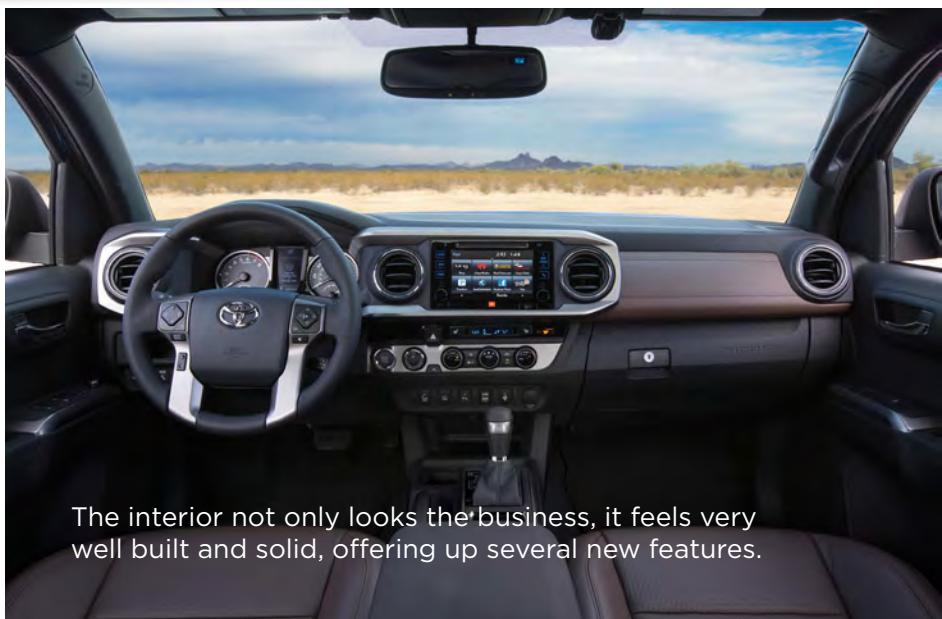
In terms of off-road technology, Toyota has updated their Multi-Terrain Select system, which allows the driver to choose between loose rock, mud and sand at the touch of a button. Each input regulates wheel spin by adjusting throttle and brake pressure to provide maximum traction. Also available will be Toyota's Active Traction Control, and Crawl Control allowing the driver to select their own speed while tackling rough terrain.

Toyota is so pumped that future Tacoma owners will be exploring the limits of their trucks in extreme situations (constantly referring to its desert blazing abilities) that they have teamed up with GoPro, offering a GoPro camera mount located near the rear-view mirror as standard on all trim levels.

Toyota sure was talking up the new Tacoma's off-road prowess and abilities, almost to the point of comparing it to a Raptor... almost! Will the new Taco be all that? There is still a lot of unanswered questions and we for one are very curious as to the new Tacoma's true abilities, both mechanical and driving wise. Stay tuned, as we keep up to date with one of our favourites.



Much like the Tundra, the Tacoma sports embossed lettering on the tailgate.



The interior not only looks the business, it feels very well built and solid, offering up several new features.





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**FEATURE**

*Story and photos by Budd Stanley*

# RAPTOR RESURRECTION

FORD SURPRISES WITH 2017 RAPTOR



## Just getting the chance to sit in the fabled seats of the Joe Louis

arena was a spectacular experience for me, let alone being blown away by Ford's unbelievable performance jab as it launched the herculean Shelby GT350R and the mesmerizing Ford GT hypercar. But as exciting all these things were, I was sitting on the edge of my stadium seat, camera in hand, drool in mouth for Ford's off-road addition to the performance trio.

Yes, the Raptor is alive and well and will be sporting an aluminum body and EcoBoost power!

So, what do we know after Ford gave us a tantalizingly short glimpse of the next generation Raptor? That new aluminum body that features some new design queues will also shave 227 kg (500 lb) off the current generation Raptor. The Raptor will be 6-in wider than the standard F-150 for improved off-road stability, making use of new 17-in wheels with the next-generation BF Goodrich All-Terrain KO2 tires that Editor Mack found quite impressive a couple issues back, and then winter-tested in this issue.

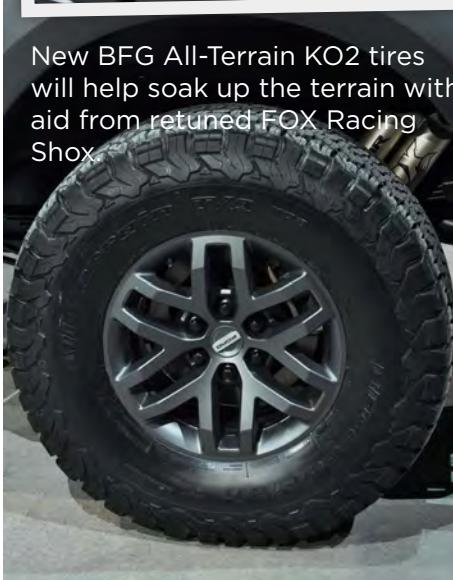
All the extra bulges and venting sure do make the upcoming Raptor look even more fearsome than the last, but what really matters is what will be motivating the big Ford. Yes, the EcoBoost name will be making its way into the Raptor and it will be the 3.5L V-6. I can feel eyebrows starting to rise, but fret not power hungry truckers, the Raptors new EcoBoost will be producing more horsepower and torque than the old 6.2L V-8, which was rated at 411 hp and 434 lb-ft.

Another eyebrow raiser is that the EcoBoost will be mated to a ten-speed automatic transmission with paddle shift capability. The question has to be, will all those little gears crammed into the box make the future Raptor as impressive fuel efficiency wise as it will be in pure performance, or will so many close ratio's crack under the big power numbers the EcoBoost is expected to produce?

To help handle all that power in different conditions, Ford have completed a major overhaul of their off-road driving aid technology. An all-new Terrain Management System now allows drivers to program the vehicle to best handle both en-



There is no missing the Raptor with "FORD" emblazed across the tailgate.



New BFG All-Terrain KO2 tires will help soak up the terrain with aid from retuned FOX Racing Shox.

"Sand" mode for muddy and sandy trails and terrain, "Baja" mode for high-speed desert running and "Rock" mode for low-speed rock crawling.

Finally, the Raptor will receive increased suspension travel with completely redesigned FOX Racing Shox. Front and rear shock canisters have grown from 2.5 inches to 3 inches in diameter for improved damping capability in harsh conditions. They will also feature more suspension travel than the current Raptor's 11.2-in at the front and 12-in at the rear.

vironmental and terrain conditions. There are six preset modes for the truck starting with "Normal" mode for everyday driving and "Street" mode for higher-performance, on-road driving. Weather modes can be selected for "rain," "snow" or "ice." Finally, terrain can be specified with "Mud and

There is no doubt about it, the next gen Raptor looks to be the beast of the bunch. Despite several other manufacturers building imitations, the second edition Raptor looks ready to devour all who challenge. However, there is still a lot to learn about this desert terrorist before it goes on sale in the fall of 2016, but we will do our best to keep you informed of all the latest numbers and updates.



Just in case you missed it; this is a Ford, and it's wide and angry!

## FEATURE

*Story and photos by Budd Stanley*

# REBEL ROUSER

The Raptor has some new competition from Ram

**REBEL**



No familiar crosshairs on the Rebel, only a very bold and large Ram logo, much like other special off-road edition trucks.

**Just when I thought Detroit had** given me all the off-road candy a little sugar junkie could handle, Ram went and pulled the sheets off the all-new Ram 1500 Rebel. Not just any 1500, this Ram is definitely got the Ford F-150 Raptor in its sights. Ironically enough, the most obvious sign that this is a special Ram 1500 is the lack of the trademark crosshairs grille, replaced with a very bold and somewhat familiar brand logo.

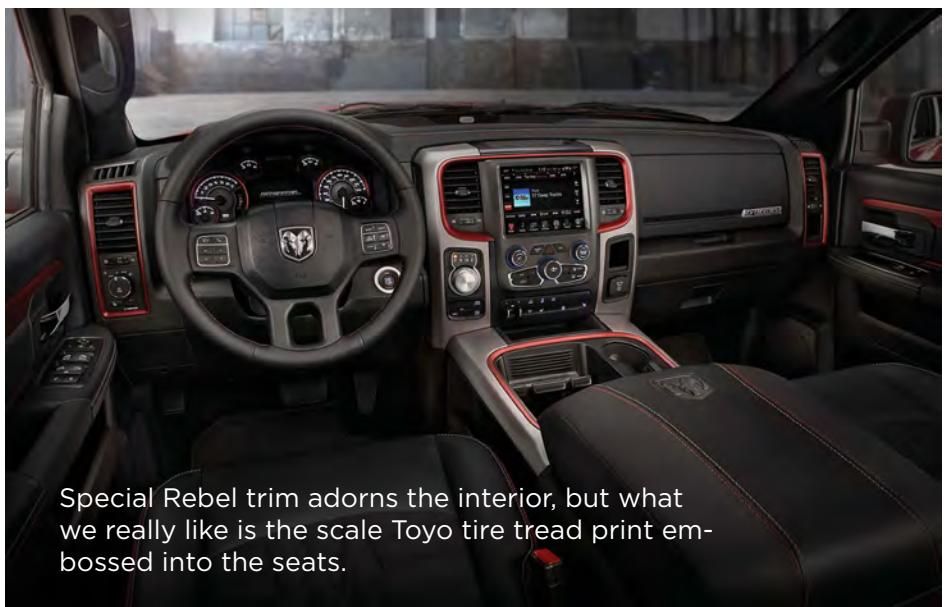
So, we might as well start with the styling. Yes, the familiar crosshair grille that has adorned all Rams for as long as we can remember is gone, replaced with a truly unique grille highlighting the "RAM" brand name. Likewise, the same bold design can be found on the rear, where a large Ram emblem has been embossed into the tailgate along with other Rebel insignia. These special edition design traits are also found in the interior as the seats have been finished in high-durability technical grain vinyl with



Another large "RAM" logo is embossed in the rear tailgate for good measure.



A 1-in lift in addition to adjustable air springs helps fit 33-in Toyo's under the fenders.



Special Rebel trim adorns the interior, but what we really like is the scale Toyo tire tread print embossed into the seats.

Sedoso fabric inserts embossed with the Toyo tire tread pattern, matching the Rebel's actual tire footprint. Now that is pretty cool.

This leads us to the business end of the Rebel; the hardware that makes it a true off-road focused enthusiast's truck. As mentioned, a set of 33-in Toyo Open Country A/T all-terrain tires are mounted to very unique all-new 17-in silver and black cast aluminum wheels. The Rebel also gets a 1-in factory suspension lift that is further aided by adjustable air springs to lift the Ram to a maximum ride height to 262 mm (10.3-in). The ride is fine tuned with a set of custom Bilstein shocks front and rear as well as a softer rear stabilizer bar to further aid the all-terrain capabilities. Other off-road durability and recovery add-ons include skid plates and suitably beefy tow hooks.

While the Rebel looks like a Raptor fighter, it will not have any special high performance powertrain options to compete with Fords upcoming EcoBeast. Buyers will have the choice of either the 3.6L Pentastar V-6 or the more aggressive 5.7L HEMI V-8. Those who choose the more fuel-efficient Pentastar will also get the 3.92 final drive ratios in the front and rear differentials.

We have to say, while the Rebels powertrain may not be screaming after the Raptor, we sure do like the increased off-road capabilities Ram have built into this special edition 1500. Expect the Rebel to reach dealership showrooms by late summer this year, but before then, we'll keep digging for more info on the Rebel as it becomes available.



Toyo Open Country A/T's connect the 1500 to the trail.

**READER'S RIDES**

# TJ REVIVING A RUSTY WRANGLER FOR TRAIL DUTY REGENERATION

Story and photos by Burns MacDonald, additional photography by Heather MacDonald



**T**here comes a time when most off-roaders realize that they are running on borrowed time. I have never been happy with the axles on my Jeep. Not that they let me down, but I just wanted to go to the next level in terms of gearing and tires. To do so, I needed to move beyond the Dana 35/30 combo that is stock for an early TJ.

I had taken my rig into National 4-Wheel Drive in Smiths Falls to get some rust repairs done. Once they had stripped the rocker armour off, the rot was much more extensive than I had realized. This meant a bigger job and more metal to be added, including the sills and tub mounts - in short, it wasn't going anywhere for the winter. Dan and the guys at National would work on it in slow periods, which would be a little more affordable.

While they had it there, I asked Dan to check the dripping from the front pinion and confirm that the chromoly axles he had installed a couple of years back for a previous owner, were still there. As it turns out, the pinion bearings, seal and crush sleeve needed to be replaced and the chromoly axle shafts had been removed by the previous owner and replaced with OE ones. Sooner or later, the stock Dana 30 in the front of my 1998 TJ would succumb to oversize tires and the demands of rock-crawling and give out on me. The back axle was a little better as it had a Super 35 kit, but the OE TJ Dana 35 tubes and differential housing are notoriously weak, so any project to change the front, should include the back. I didn't realize it then, but this creeping rationalization that allowed the one problem to be solved by fixing two more, would become the main theme of what would become a full winter-long build.

Originally I pursued getting a set of Rubicon Dana 44's from another Jeeper in the region, however as usual by the time I decided to buy them, they were sold. After a week of searching, it was clear that there were no other good used candidate axles in the area. This meant looking at crate axles, and I decided to go with G2 axles. One of the main attractions were that they were a 'bolt-in' replacement – little did I realize then that I would eventually not end up using any of the factory mount-points and brackets.

Any decision on axles must take into



When they say "crate axles" that's exactly what they mean! The G2 Dana44 and Dana60 arrived in stout wooden crates from California.



A bevy of genuine Currie Engineering Johnny Joints were used instead of bushings. These come with weld-in bungs, are re-buildable, and offer superior articulation.

account intended tire size and gear ratios. I had been running 35x15's with 4.88 gears, but I wanted to go slightly north of that and 'up-size.' The terrain here is rugged Canadian Shield and larger tires and lower gears would help improve the rig's rock-crawling capabilities. Looking at G2's axle offerings, I noticed that for only a small difference in cost over their Dana 44 axle, I could order their Rock Jock Dana 60. This assembly uses the Currie Enterprises high-pinion angled

housing and comes with optional rear disc brakes and a range of gear ratios and locker choices. In the end, I settled on the G2 Dana 44+ in the front, equipped with an Eaton eLocker, and the Rock Jock 60 fitted with the disc brakes and a Detroit locker in the rear. Both axles were running chromoly shafts and 5.38 gear ratios.

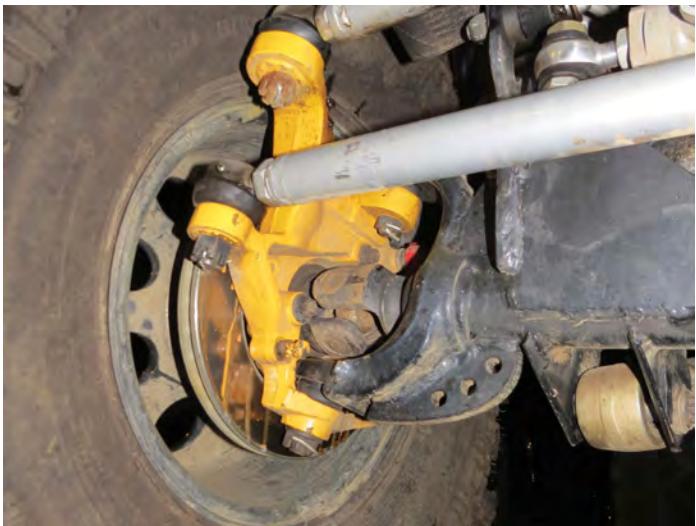
By now, it was clear that this was going to be a bigger project than I had originally planned. Luckily, Dan Trudel from Smiths



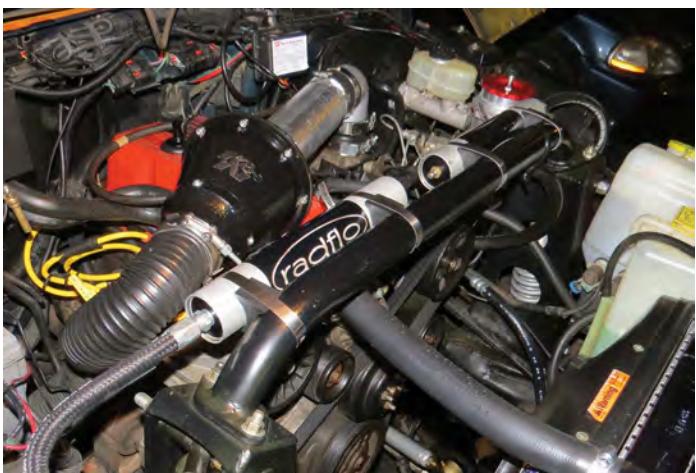
Although G2 claims their Dana-44 axles to be stronger than OE Rubicon axles, we decided to go with a full width truss for extra strength to mount the upper control arms.

You can also

see the lower coil-over mounts have been tacked in place and when fully welded will also act as a gusset for the top of the inner C.



A beefy Tereflex High Steer knuckle was used on the passenger side to allow the use of a full-width drag link. 1 Ton GM truck tie rod joints and 1 inch x 0.250 wall DOM tubing was used to handle the abuse.



The coilover towers now house Radflo coilovers and the cross-brace is highly recommended.

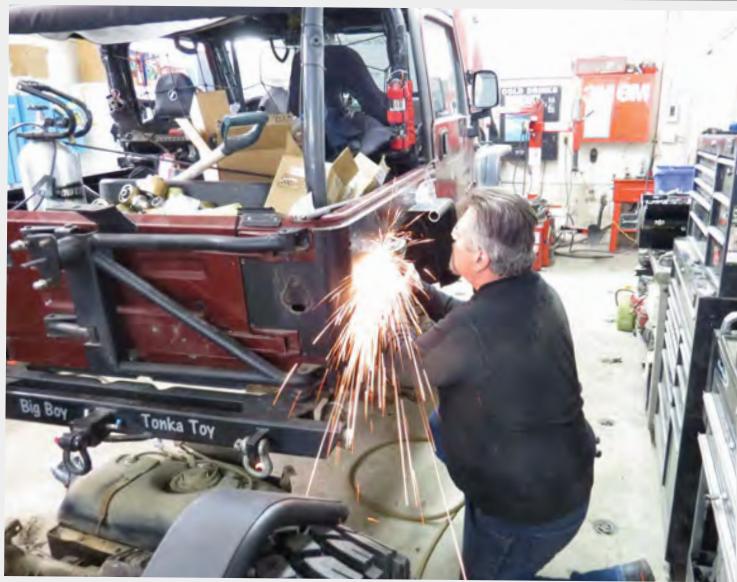
Falls National4WD took me under his wing and we worked together. Tim Rogers at TMR Customs is also a good friend and through the build he, Dan and I became the “design team.” While I also did some of the work around the edges, Dan and his crew did all of the real hardcore fabrication.

Planning and design became key. With the much bigger Dana 60, the rear axle would have to be relocated further back to provide a workable drive shaft set-up. To solve that problem, the rear track bar had to go and I decided to remove the rear gas tank as well, giving me more ground clearance and a better departure angle. In the end, we moved rear axle back almost 5-in and the front axle forward about 1.5-in. This extended the TJ’s wheelbase to just a tad under the ‘magic 100’ figure desired by many rock-crawlers. For the fuel tank, I ordered a 20-gallon fuel Genright fuel cell, with roll-over valves and a safety cover. But we still had to solve the problem of the missing rear track bar.

I was already running a rather worn 6-in long arm lift kit and was getting tired of changing the poly bushings every season. In the end, I decided to go with a triangulated 4-link set up, with the upper arms converging on the top of the Dana 60 housing. Currie provides pre-threaded mount points of the top of their housing, but we decided to reinforce that by adding a small saddle truss. The upper and lower arms were fabbed from 2-in, .025-in wall DOM tubing, with Currie Johnny Joints on each end. Relocating the axles meant moving the mount points on the TJ frame. In rock-crawling, suspension flex is the name of the game and moving the existing OE coil spring perches and shock mounts involved as much labour cost, as installing other alternatives. I decided to bite the bullet and go with Radflo coil-overs from TMR Customs, which give greater articulation, stability, and can be fine-tuned to suit any need. Installing the coil-overs involved frenching in towers in the back, each of which were double-gusseted. In the front, we used full towers and a cross bar, as we considered it to be a stronger set-up than the hoops that are sometimes used. Moving the rear axles also meant that the rear wheel wells were radiused out to the maximum, with the opening brought to the very end of the body tub.

For now I retained the radius arm set-up on the front, although we had to replaced the radius arms with longer ones to convert from bushings to Johnny Joints. By using sets of left and right thread joints with jam nuts, adjusting caster angle on the front axle now becomes a minor 10-minute job. Although G2 specs their Dana 44 as being stronger than OE Rubicon axles, we decided to reinforce the axle further. A full width truss was fabricated. The inner C’s were reinforced on the bottom with gussets from TMR, while the bottom coil-over mounts also double as gussets on the top of the C’s. We fabricated the tie-rod out of 1.5-in 0.250 wall DOM tubing and used 1-ton Chevy truck tie-rod ends with weld-in bungs from TMR. Instead of the standard OE wishbone drag link set-up, which has problems in high flex situations, we made a full length drag link out of the same material as the tie-rod, attaching it to a beefy Terraflex high-steer knuckle on the passenger side using a 1-ton Chevy rod-end.

For tires, I originally decided on 37x12.50x15 Maxxis Creepy Crawlers. However, when we mounted them on the rig, I just didn’t



Burns was able to take a couple of weeks off work to help open the rear wheel wells right back to the corner of the tub.

like how much the tread-face was crowned in the middle, despite the fact I was using rims of the recommended width... somehow they just didn't look right. So, switch to plan B... Super Swamper TSL SX 38.5x14.50x15's. In fact, these chunky bias ply tires measured closer to 38 plus inches "out of the box" and the 5.38 gear and beefed up axles should be able to handle them just fine. In fact, the ratio calculations worked out perfectly and very close to what I was running with 35's and a 4.88 gear.

With such big tires, I needed to beef up the stock TJ steering. I considered converting to a Dodge Durango steering box, but in the end went with a complete hydraulic-assist solution from PSC in Texas. Lance Gilbert at PSC put together a great package for my needs. He knows his stuff - Lance is a long-standing King of the Hammers competitor and one of the editors/moderators of Pirate 4x4. That package consisted of their brand new (not refurbished) steering gearbox, a high performance pump, a ram cylinder, reservoir, and a cooler (heat exchanger), plus all the necessary hoses and fittings. The quality of the stuff when you open the box is striking – real eye candy. As a final measure, we reinforced the steering box mount and added a cross-brace to reduce strain on the sector shaft.

Other additions to the build included a Flex-A-Lite Black Widow Extreme electric fan with a 3-way switch so that I can turn



Pushing around 38.5 inch tires is aided by a complete hydraulic assist setup from PSC.

it off when water crossing. Hood louvers, Mastercraft suspension seats with 5-point safety harnesses, a 150 amp alternator and a TMR Customs rear bumper were all mounted before the Jeep received final rust repairs and a killer Orange Crush paint job and graphics.

All in all, I ended up making a bigger

investment in time and money than I had originally intended, but it is now a well-designed and integrated build that is truly tailored for the wheeling I want to do. It looks great, but more importantly it is an awesome beast on the trail - its only limitation now is the old guy behind the wheel and I'm still working on that.

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# MERICAN METAL MENACE

*Words and photos by Bryan Irons*



# STINKY JEEP GETS A 401: PART 1

## Engine Autopsy

**Words never uttered while behind the wheel of Stinky Jeep would include** “powerful”, “smooth” and “low maintenance.” Now we can add “reliable” to the never-to-be-used-again descriptors of the 304 AMC V8. Oil pressure in the single digits and valves that sound like a jogger with a pocket full of change were some of the last nails in the coffin before we pulled the trigger on an engine build. We’re going to cover the whole thing here in 4WDrive from teardown to a dyno run to see where we end up. We wanted something that would make for an easy swap, make power in the 1hp/cu range, be reliable to run in traffic, and easy to make upgrades in the future. Presenting the Merica Metal Menace 401 AMC.

The choice of the 401 AMC was a risky one as they are becoming harder to come by. AMC’s V-8 architecture remained almost the same between their engines ranging from 290 cu up to the massive 401. Minor differences occur, as with any mass produced engine, so do your homework when deciding on what suits your build needs. Sure, the pedestrian 360 cu version would have fit our build specs just fine and are much easier to source, but the added displacement of the 401 coupled with the much stronger forged steel crankshaft could not be ignored. Lucky for us, we “knew a guy” who happened to have one lying around. A deal was struck to score the vintage block that was scavenged from a 1974 Jeep J-20.

With the block in our possession, it was teardown time and we were ready to take a peek at what we had to work with. Follow along as we show you a few ways to check for previous owner shenanigans and what to look for in a good seasoned engine block before shelling out your hard-earned clams on a potential Metal Menace.



**1** Drain any used engine oil into a bucket or pan for inspection. Use your sense of smell here too and don’t be afraid to get dirty. Water or a light brown chocolate milk substance is bad and means water has gotten into your block. Look for metallic shavings or chunks of steel. Ours was black as night and smelled of old fuel; we gave it to Editor Stanley as Christmas gift cologne.

**2** Before the major deconstruction begins, get boxes or bags to place bolts and hardware in. Tag them too. If you are going to use sandwich bags, take the PBJ out first and use freezer bags so they don’t tear open.

**3** We pulled the valve covers first and discovered very little engine buildup or “gunk”. A sign that the oil had been changed regularly by the previous owner. Good-good!

**4** A quick glance at the top of the heads and rockers showed nothing amuck. Pushrods were tight and everything was in alignment.

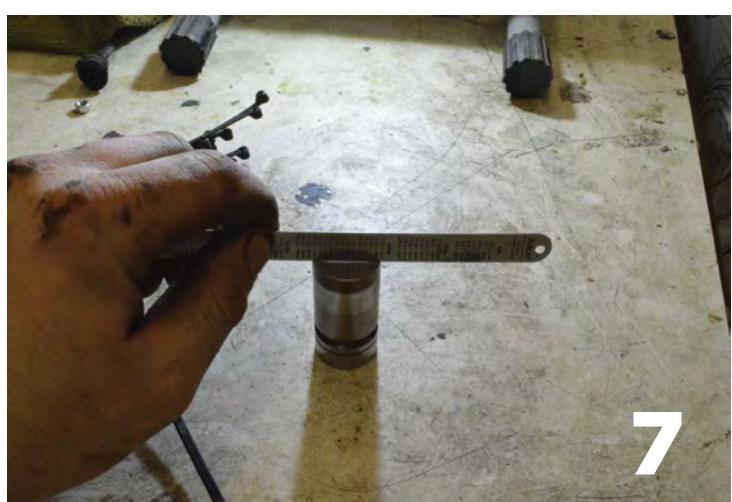
**5** Closer inspection revealed mismatched bolts and different markings on the rockers. Casting marks were searched online, which revealed that the heads were from a 1977 AMC 360. It was becoming clear that at some point this engine had been cannibalized.



**6** We pulled the rockers and all the push rods. If you plan on reusing any of the parts it is best to keep them organized and mark what location they came from. To check for bent pushrods, grab a piece of glass and roll the rods on them, any wobbling will be apparent, and sign of abuse. All 16 of ours were straight.



**7** Lifters can come out of the block with pliers or a magnet. If you have a roller cam, ensure that the rollers turn smoothly. For a flat tappet cam like our engine has, use a straight edge to see if the lifters are still convex. All of ours were concave, hinting at oil starvation or, seeing as we knew the engine had been opened up before, inferior parts or break-in procedures could be to blame.



**8** The top of the valve stems can tell a story as well. Most of ours showed little wear, but a few had small divot marks like those on the right intake valve.



**9** To pull the heads, loosen all the bolts a little at a time to relieve the stress evenly. When all the bolts are out, lift the head straight up to avoid damaging the alignment dowels. Scour the heads like a hound after a squirrel. Look for valve damage, cracks between cylinders, gasket failures, or anything else unusual. You can even put a straight edge across the heads to check for level. Something caught our eye...

**10** A very bad exhaust valve. Notice the two cracks on either side? This is a burnt exhaust valve. They are normally caused by a poor mating surface with the valve seat or a build up of carbon on the valve. This sort of damage also occurs when an engine is overheated. It's not a deal breaker, but if you plan on keeping the heads, you will have some additional machining costs to repair.

**11** Try to keep the head gasket intact after taking the head off. Look for cracks, blow-by, and coolant leaks or burnt sections, all are bad, but repairable. Many head gaskets are stamped with a manufacturing date, as are engine bearings.



**12** Looking into the cylinders with the head off revealed VERY little wear. You may feel a slight ridge at the top of the piston holes where the piston rings stop. Burn marks, holes, rust, carbon buildup and many other signs of abuse or impending doom may greet you at this point as well. Using a set of simple calipers told us that this block has never been bored out and was still factory fresh. We are making progress but are only half way done on the teardown, read up next issue on what other gremlins we find lurking in the Menace.

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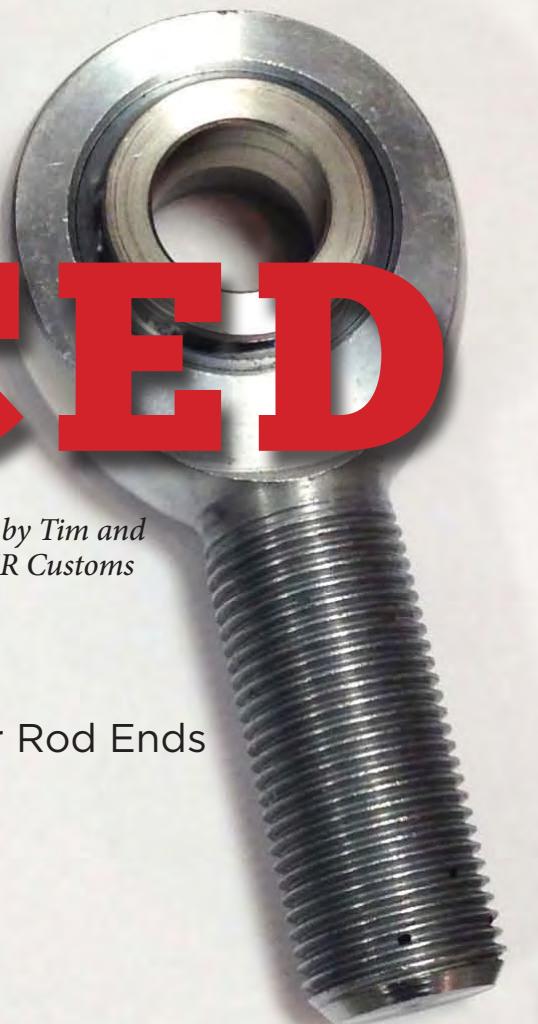
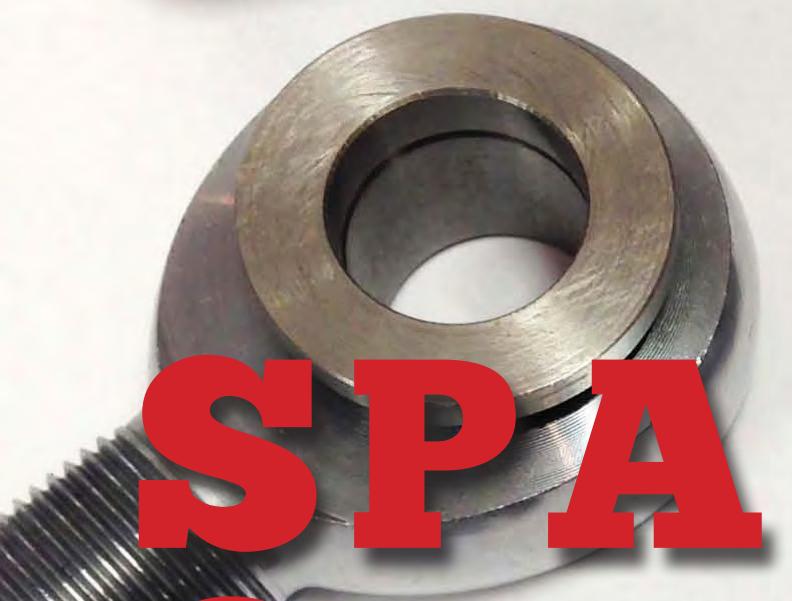
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# SPACED OUT

*Story and photos by Tim and  
Mike Rogers, TMR Customs*

How to choose the right Spacers for your Rod Ends





**C**hances are if you are using rod ends (also referred to as heim joints) on your rig you've spent some time scratching your head trying to determine what type of spacers you need. There are a ton of options – cone spacers, high misalignment spacers, step down spacers, safety washers, etc. Each one has a different purpose and it's important to choose the right spacer for your application. Follow along as we educate you on what to look for when choosing spacers for your next project that uses rod ends.

The first choice you have when choosing rod end spacers is the material they are made from. TMR Customs only produces and recommends spacers made from high grade domestic stainless steel. Stainless steel spacers are the preferred choice due to their strength and corrosion resistance – often times they will outlive your rod end and can be re-used multiple times before replacement is required. Cheaper spacers are often made from imported poor grades of stainless steel, mild steel or aluminum and they are highly prone to crushing under severe use, which will provide inadequate torque on your fasteners. This will cause loose nuts and bolts on your suspension and steering components.

### High Misalignment Spacers

High Misalignment Spacers are the most popular type of spacer for 4WD vehicles since they provide your rod ends with the greatest amount of misalignment and flex. They reduce the rod end bore size down to a smaller bolt and extend the ball diameter of the rod end. High Misalignment Spacers are most widely used on applications where a great deal of misalignment is required – either in a steering system or a link suspension kit where there are large amounts of up-travel and/or droop. Since High Misalignment Spacers reduce the bore of your rod end they must always be used in pairs – one for each side of the rod end.

### Cone Spacers

Cone Spacers provide a small improvement on the rod ends ability to misalign and flex. They are best used when you need to retain the existing bolt size of the rod end for maximum strength and your rod ends are perfectly aligned and sitting neutral within their brackets. Cone Spacers should not be used when a high amount of travel or misalignment is required. Cone Spacers are generally short in overall height so they can also work great as a general spacer where additional height or clearance is required.

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## Step Down Spacers

Step Down Spacers are an effective way to reduce the bore of a rod end in applications where a cone spacer or high misalignment spacer is not required. The shoulder thickness on step down spacers is very thin, which helps in applications where you have limited space for mounting rod ends. Step Down Spacers can also improve the versatility of parts you already have – say you have a rod end with a  $\frac{3}{4}$ -in bore and a steering knuckle with a  $\frac{5}{8}$ -in hole. If you do not have the ability to drill out the knuckle to  $\frac{3}{4}$ -in you can simply use a pair of step down spacers to reduce the rod end bore to  $\frac{5}{8}$ -in. Similar to High Misalignment Spacers Step Down Spacers must be used in pairs since they reduce the rod end bore.



## Safety Washers

Safety Washers are designed to be used in conjunction with rod ends that are mounted in single shear and are most commonly used in steering applications. If the rod end body were to break and separate from the rod end ball, the safety washer would prevent the rod end body from passing over the head of the bolt resulting in a total loss of steering control. The “dished” shape of a Safety Washer also means they can be useful in providing a small amount of misalignment. Since Safety Washers do not reduce the rod end bore, they can be used individually and are not required to be used in pairs.



TMR Customs is the industry leader when it comes to all styles and sizes of rod end spacers. All TMR Customs spacers are CNC machined in-house from high-grade domestically made stainless steel. Should you have any questions regarding what spacer is best for your application do not hesitate to contact us for more information.

**TMR Customs Rod End Spacers are available for purchase direct or through one of our Authorized Dealers.**

**For more info please visit [www.tmrcustoms.com](http://www.tmrcustoms.com)**



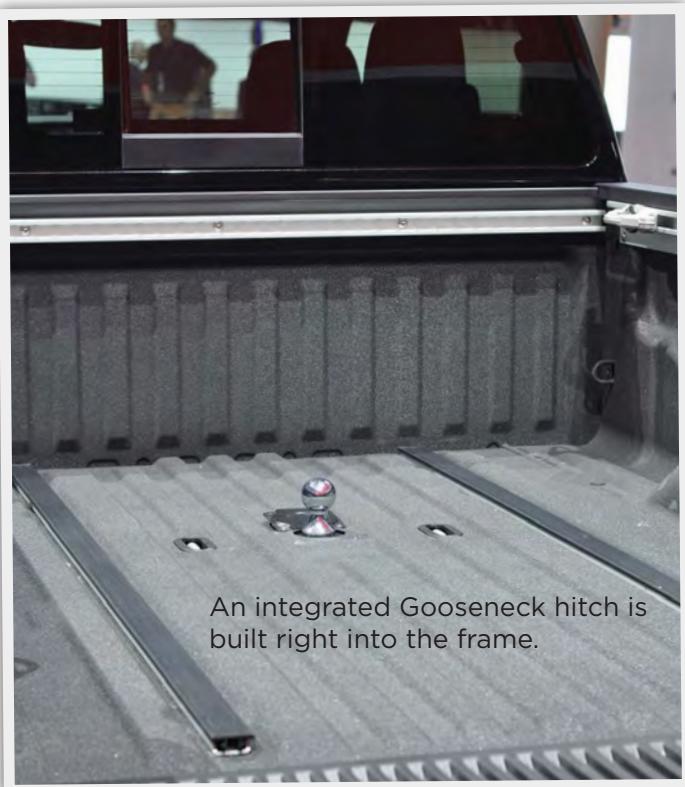
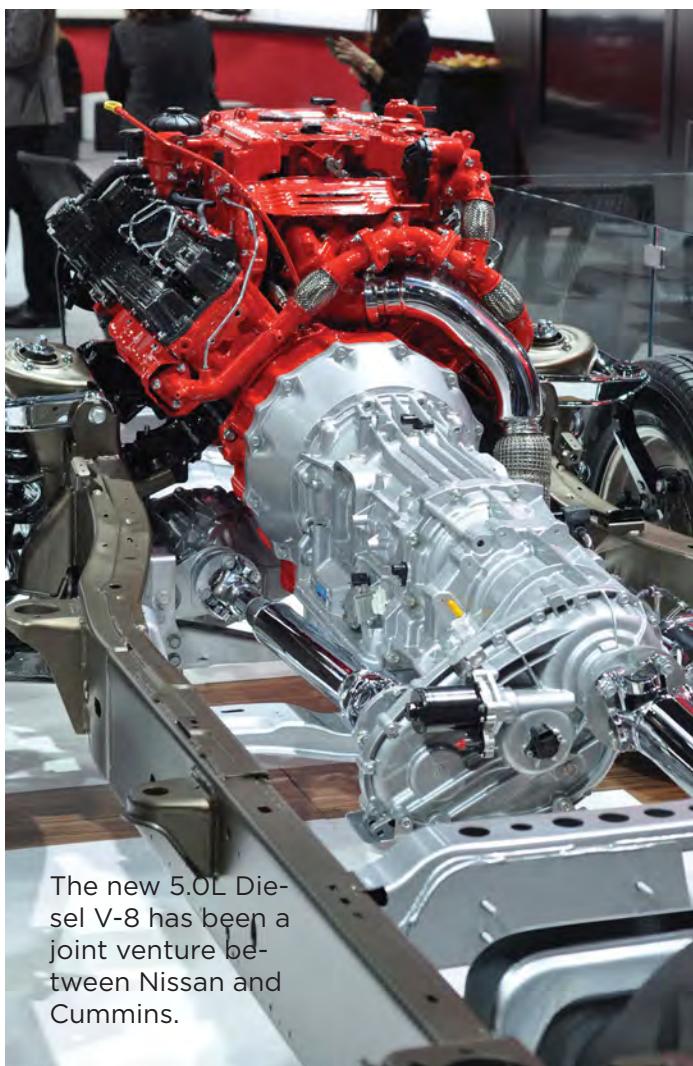
## Continued from page 53

has been supported directly into the frame, allowing for the flush fitment of a gooseneck ball to the bed when the need to haul heavy trailers arise.

To aid those who tow, several towing functions have also been added such as an Integrated Trailer Brake Controller, Trailer Sway Control (TSC), Tow/Haul Mode with Downhill Speed Control and a Trailer Light Check system that allows for one person to hook-up a trailer, capable of checking turn signals, brake lights and running/clearance lights from inside the cab.

Like all other Nissan 4WD's, a PRO4X trim will be available, with increased off-road capability over the regular and Platinum Edition Titan XD's. This includes a proper mechanical eLocker in the 10.5-in solid rear axle, Bilstein shocks and skid plating on the underside of the chassis. Of course, there is an electric two-speed transfer case that will allow the driver to switch from 2WD, to 4-high or 4-low. We hope to learn a little more about this trim level later this fall for the planned launch of the Titan XD.

This first wave of Titans will only be available in the XD trim with Cummins diesel, 4WD and double cabs to start. After the first run of vehicles, Nissan will slowly start adding regular Titans, gasoline powertrains (an all-new 5.6L V-8 and an as of yet unknown V-6), 2WD and both Crew and Regular cab configurations like a rolling barrage. Stay tuned, as we will be all over the many different faces of Nissan's new Titan.





# Family Glass

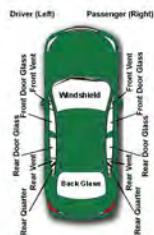
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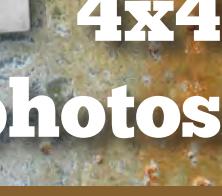
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Continued from page 28

**15** We aligned the ad-a-leaf in the pack with the longer length facing to the rear, making note NOT to place it below the overload spring. This is important as it determines the actions of the spring. It took a little while to find a technique of moving C-clamps around to maneuver the ad-a-leaf into alignment.

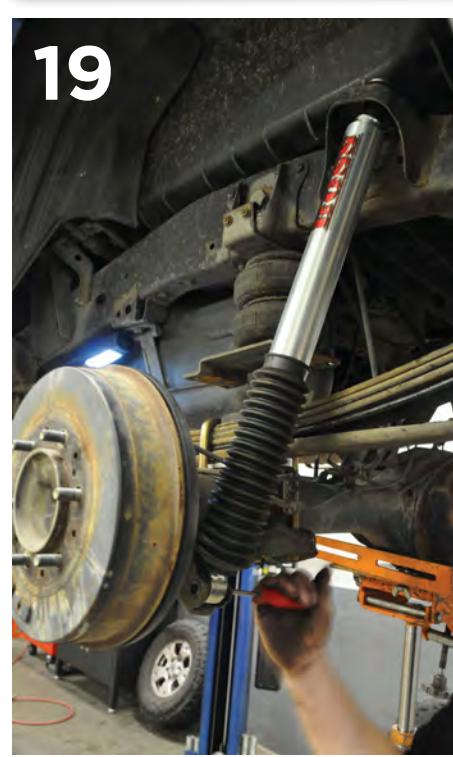
**16** With the new spring centre bolts that were provided, we re-install the bottom overload spring to the main spring pack holding it in alignment with the old bolt.

**17** With the axle back into place, we fit the supplied axle shims, place the centre bolt head through the shim centre hole and into the spring perch and cut most of the remaining threads off the top to allow clearances for the previously installed air bags. Toytec note that the thinner end of the shim should face toward the front of the vehicle, which will align the driveshaft properly to avoid any vibrations.

**18** Re-install all bump stops, the new U-bolts, axle plates, washers, and nuts. Torque U-bolt nuts to manufacturer specs. An old German trick, we spray wax on all the exposed threads to stop corrosion.

**19** We can now re-install shocks, E-brake cables, and rear wheels. Make sure to torque all bolts and lug nuts to manufacturer specs. We performed a shakedown drive around the block to settle the suspension. Park on level ground with tires straight and the steering wheel locked in the centre position. Take another measurement of the ride height to determine how much lift you achieved from the factory pre-load. Adjust as needed to gain the final lift height.

**20** Tip of the week, retorque your spring bolts after driving. Whenever you put load on the axle, the axle wants to twist. And if you have soft spacers, this effect is even greater, loosening off the spring nuts. And of course don't forget to torque your wheels and perform an alignment as well.



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